PROJECT MANUAL

FOR

BOSSIER CITY, LOUISIANA

LLW Architects, Inc.
803 South Mount Moriah, Suite 100B
Memphis, Tennessee 38117

(901) 683-7175

Date: November 23, 2007

SET NO. _____

BOSSIER CITY, LOUISIANA

LLW Architects, Inc.
803 South Mount Moriah, Suite 100B
Memphis, Tennessee 38117

(901) 683-7175

Date: November 23, 2007

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SECTION 00015

LIST OF DRAWINGS

INDEX OF DRAWINGS

1.01 See Contract Documents drawings for the index of all drawings.

END OF LIST OF DRAWINGS

SECTION 00300

INFORMATION AVAILABLE TO BIDDERS

EXISTING REPORTS AND SURVEYS

1.01 SUBSURFACE INVESTIGATION REPORT

A. A copy of a geotechnical report with respect to the building site is included with this document:

END OF INFORMATION AVAILABLE TO BIDDERS

SUBSURFACE INVESTIGATION

FOR

PROPOSED SIX STORY HOLIDAY INN
BOSSIER CITY, LOUISIANA

PREPARED FOR:
SOUTHERN HOSPITALITY SERVICES, INC.
1407 MARTIN LUTHER KING DRIVE
MONROE, LOUISIANA 71202

PREPARED BY:

TETRA TECH INC.
Dba Maxim Technologies
P.O. BOX 19220
SHREVEPORT, LOUISIANA 71149

MAXIM FILE #060354/PROJECT #6220907

MARCH 1, 2006

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MAXIM
TECHNOLOGIES INC
A TETRA TECH COMPANY

7222 Greenwood Road
Post Office Box 19220
Shreveport, LA 71149-0220

(318) 636-3673
Fax (318) 636-3723

March 1, 2006

Southern Hospitality Services, Inc.
1407 Martin Luther King Drive
Monroe, Louisiana 71202

Attention: Mr. Nash Patel

Reference: Subsurface Investigation
Proposed Six Story Holiday Inn
Bossier City, Louisiana
Maxim File #060354/Project #6220190

Gentlemen:

Enclosed is Maxim's Subsurface Exploration Report for the above referenced project. Maxim Technologies (Maxim) will be happy to assist you further on this project by furnishing any Construction Materials Testing Services you may require. We are a full service laboratory with NICET certified engineering technicians and can supply the full range of testing services such as soils, concrete, asphalt, steel, roofing, etc.

It has been a pleasure to perform this work for you. If we can be of any further assistance, please do not hesitate to call on us.

Very truly yours,
TETRA TECH INC.
Dba Maxim Technologies

STATE OF LOUISIANA
ALFRED E. JOHNSON
REG. No. 27902
REGISTERED
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
MAR 06

Alfred E. Johnson
Project Engineer

Lloyd G. Hoover, P.E.
Louisiana Manager

AEJ/LGH:mfh

cc: (3) client

SUBSURFACE INVESTIGATION
FOR
PROPOSED SIX STORY HOLIDAY INN
BOSSIER CITY, LOUISIANA

1. GENERAL

This study was authorized by Nash Patel of Southern Hospitality Services, Inc. in February 2006. The purposes of the study were to (1) explore the subsurface conditions present at this site, (2) determine the pertinent engineering properties of the materials encountered, (3) develop recommendations concerning suitable foundation types for the proposed construction and (4) provide pavement information.

The site of the proposed construction is located in the 3100 block of Hilton Drive in Bossier City, Louisiana.

2. PROJECT DESCRIPTION

The proposed construction is a six (6) story hotel with parking area. The structure is expected to have load bearing concrete block walls and interior columns. Wall loads will be up to 12 kips per foot and maximum expected column loads are about200 kips.

3. FIELD OPERATIONS

The subsurface exploration at the site consisted of three (3) borings in the structure area drilled to fifty (50) feet deep, one (1) boring in the canopy area drilled to ten (10) feet deep and two (2) borings drilled to five (5) feet deep in the parking area. Boring operations were performed on February 27, 2006. The locations and depths of these borings were furnished by the owner and verified by the geotechnical engineer.

A truck-mounted auger-drilling rig was used to advance the borings and to obtain samples for laboratory evaluation. Standard, thin-walled, seamless Shelby tube samplers were used to obtain specimens of cohesive materials. These specimens were taken continuously to a depth of ten (10) feet below the existing ground surface. Below this depth, samples were obtained at intervals of five (5) feet as the borings were advanced.

Any soils which contained enough cohesionless material to prevent recovery of undisturbed samples were evaluated by means of the Standard Penetration test. This test consists of determining the number of blows required by a 140-pound hammer dropped 30 inches to achieve a one-foot penetration of the soil. This number is then related to "in situ" density of the material.

All the samples obtained were logged, sealed and packaged in the field to protect them from disturbance and maintain their in situ moisture content during transportation to our laboratory.

The location of the test borings (Boring Location Diagram) and the results of our boring program (Logs of Boring) are in Appendix A of this report.

4. LABORATORY TESTING

Upon return to our laboratory selected samples were subjected to standard laboratory tests under the supervision of a soils engineer.

The Atterberg Limits, "in situ" unit weights, moisture contents and percent passing a #200 sieve of the different subsurface soils were determined. These were used to classify the soils and evaluate their potential for volumetric change.

Unconfined compression tests performed on selected undisturbed samples were used to evaluate the shear strength of the different subsurface materials. The results of our testing program are included on the Logs of Borings.

5. SOIL CONDITIONS

The soils found at the site were generally composed of very stiff to medium clays (CH) in the upper thirteen (13) to twenty (20) feet underlaid by loose silty sand (SM) to about the depth of thirty (30) feet. Below this depth firm sand with silt (SP-SM) was encountered to at least fifty (50) feet deep. All deep borings were terminated at the depth of fifty (50) feet below

existing grade. For a more detailed description of the soils found refer to the soil profiles on each Log of Boring in Appendix A of this report.

6. GROUNDWATER

Groundwater was encountered between fourteen (14) and twenty-one (21) feet deep in the deeper borings during drilling operations. Groundwater levels can be expected to fluctuate with seasonal, climatic and drainage pattern changes and may vary during the life of the project and should therefore be determined at the time of construction if groundwater interference with construction progress is possible.

7. SITE PREPARATION

The structure and pavement areas should be stripped if all organic or other deleterious material prior to construction.

8. FOUNDATION RECOMMENDATION

Due to the active nature and consolidation potential of the clay (CH) found at the site a shallow foundation system is not recommended at this site. A voided structural slab supported on deep foundations is recommended. A minimum void of eight (8) inches should be maintained between the foundation elements and active clay (CH) soils.

Among the feasible deep foundation options, i.e., drilled and cast in-place shafts, augercast and driven piles, augercast piles and driven piles are the more common and practical alternatives for use in the deeper sand soil profile and high water table found at the site.

Ultimate augercast pile and driven pile capacities are given in Appendix C. The ultimate capacities must be adjusted by the appropriate factor of safety. For the purposes of this report eighteen (18) inch and twenty-four (24) inch diameter augercast piles and a HP 14 x 102 steel pile were examined. Maxim will provide load curves for other pile sizes and types on request.

Removing four (4) feet of the potentially active clay (CH) in the structure area and replacing it with select fill material having a liquid limit of thirty-five (35) or less with plasticity indices between eight (8) and eighteen (18) will allow the rise of a conventional slab on grade in conjunction with voided grade beams and footings. Fill compaction should be in maximum lift heights of eight (8) inches to ninety-five (95) percent of the Standard Proctor (ASTM D-698) density. Prior to fill placement the upper eight (8) inches of in-situ soil should be scarified and recompacted to the previously specified density.

9. SETTLEMENT

Pile settlement predictions are shown in Appendix C.

10. PAVEMENT INFORMATION

Based on the soil borings the following pavement recommendations are presented. All organic surface material should be stripped and wasted. Following stripping, the upper eight (8) inches of clay soil should be disked and treated with lime (7% by weight or a percentage determined by laboratory testing) and recompacted to at least ninety-five (95) percent of the Standard Proctor (ASTM D-698) density. The subsequent paving sections can then be used.

Flexible Pavement

2.5 Inches Asphaltic Concrete
(3.5 Inches Driveway)

over

4.0 Inches Crushed Aggregate

over

Geotextile Fabric

over

8.0 Inches Lime Treated and Recompacted Subgrade

"OR"

2.5 Inches of Asphaltic Concrete
(3.5 Inches Driveway)
over

8.0 Inches Crushed Stone

over

Geotextile Fabric

over

Compacted Subgrade (95% ASTM D-698)

Asphaltic concrete should have a minimum Marshall Stability of 1800 pounds and asphalt content of five (5) percent.

Rigid Pavement

5.0 Inches Concrete
(7.0 Inches Driveway & Dumpster Areas)

over

4.0 Inches Crushed Aggregate

over

8.0 Inches Lime Treated and Recompacted Subgrade

"OR"

5.0 Inches Concrete
(7.0 Inches Driveway & Dumpster Areas)

over

4.0 Inches Crushed Aggregate

over

Geotextile Fabric

over

8.0 Inches Compacted Subgrade (95% ASTM D-698)

Concrete should have a minimum compressive strength of 4000 pounds per square inch (psi) or flexural strength of 600 psi.

11. CONSTRUCTION CONCERNS

Due to the nature of this site competent construction supervision and monitoring is required and all contracts should be written with this fact being given consideration. A professional construction materials laboratory should be utilized; that is ASTM E-329 should be met.

12. LIMITATIONS

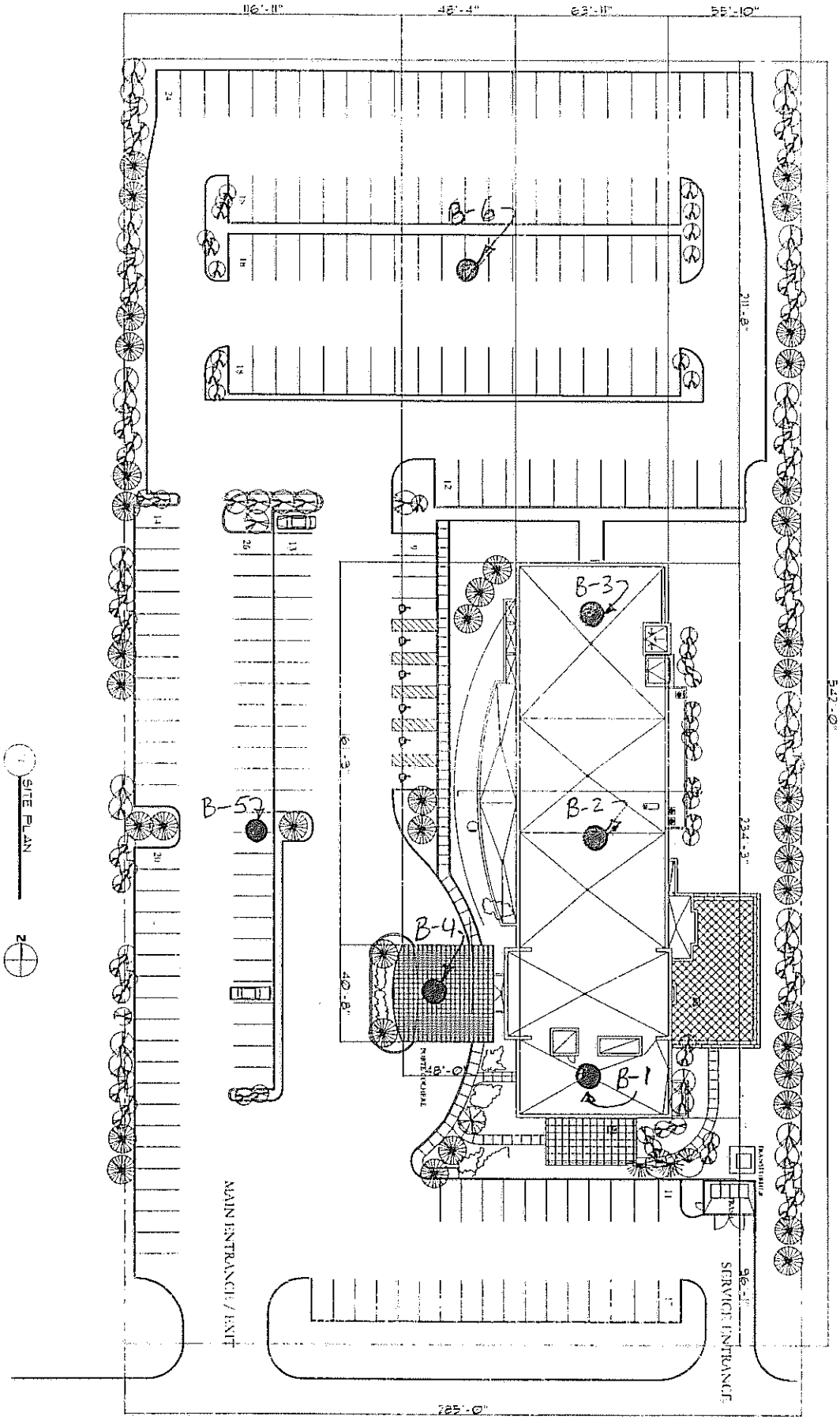
It must be recognized conclusions reached in this report are based on conditions, which exist at the boring locations, and are assumed to exist over the entire site. In any subsoil investigation, it is necessary to assume subsoil conditions between borings do not change significantly. The number of the borings and spacing are chosen in such a manner as to decrease the possibility of undiscovered anomalies, while considering the nature of loading, size and cost of the project. Consequently, careful observations must be made during construction to detect significant deviations of actual conditions throughout the construction area from those inferred from the exploratory borings.

Should any unusual conditions be encountered during construction, this office should be notified immediately so further investigations and supplemental recommendations can be made.

Analysis by: Alfred E. Johnson, P.E.
Lloyd G. Hoover, P.E.

APPENDIX A

BORING LOGS/DIAGRAM



C-1.1

SITE PLAN

Design of:

HOLIDAY INN BALANCED FULL SERVICE

Frontage Road, Louisiana

ASHISH MISHRA
architect

LOG OF BORING NO. B-1

PROJECT: Six Story Holiday Inn

SHEET 1 of 1

CLIENT: Southern Hospitality Services, Inc.

LOCATION: Bossier City, Louisiana

DATE: 2/27/06

SURFACE ELEV:

DRILLING METHOD(S): Rotary Wash

GROUNDWATER INFORMATION: Water was encountered at fourteen (14) feet depth

FIELD DATA				LABORATORY DATA									
SOIL & ROCK SYMBOL	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT, %	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	MINUS NO. 200 SIEVE, %	COMPRESSIVE STRENGTH, KSF	FAILURE STRAIN (%)	CONFINING PRESSURE PSI	DESCRIPTION OF STRATUM
				28	94	64	26	38		2.206	5.0		Stiff brown clay (CH)
				26	96					6.498	5.0		
	5			22		64	26	38					
				22	102					5.333	5.0		8.0
				21					52				Loose brown sandy silt (ML)
	10												13.5
			N=4 ▼	21					21				Loose brown silty sand (SM)
	15												
			N=5	25									
	20												
			N=10	26									
	25												
			N=1/18"	31									
	30												33.5
			N=17	15					11				Firm tan and gray sand with silt (SP-SM)
	35												
			N=25	16									
	40												
			N=31	14					10				
	45												
			N=33	18									
	50												50.0
													Bottom of boring
	55												

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

REMARKS:

060354

MAXIM TECHNOLOGIES,INC.

LOG OF BORING NO. B-2

PROJECT: Six Story Holiday Inn

SHEET 1 of 1

CLIENT: Southern Hospitality Services, Inc.

LOCATION: Bossier City, Louisiana

DATE: 2/27/06

SURFACE ELEV:

DRILLING METHOD(S): Rotary Wash

GROUNDWATER INFORMATION: Water was encountered at twelve (12) feet depth

FIELD DATA				LABORATORY DATA									
SOIL & ROCK SYMBOL	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT, %	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	MINUS NO. 200 SIEVE, %	COMPRESSIVE STRENGTH, KSF	FAILURE STRAIN (%)	CONFINING PRESSURE PSI	DESCRIPTION OF STRATUM
				32	93					3.356	5.0		Stiff brown clay (CH)
				31	91	64	26	38		1.467	5.0		--Becoming medium
	5			32	87					4.232	5.0		--Changing to very stiff
				35	87	74	28	46		2.600	5.0		--Becoming stiff
				17									
	10												
													13.5
	15	X	N = 5	23					63				Loose brown sandy silt (ML)
													18.5
	20	X	N = 4	24									Loose brown silty sand (SM)
		O	N = 3										
	25												
	30	X	N = 5	33		30	19	11					
													33.5
	35	X	N = 24	15					6				Firm tan and gray sand with silt (SP-SM)
		X	N = 25	10									
	40												
	45	X	N = 31	13					13				
		X	N = 36	15									
	50												50.0
													Bottom of boring
	55												

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

REMARKS:

060354

MAXIM TECHNOLOGIES,INC.

LOG OF BORING NO. B-3

PROJECT: Six Story Holiday Inn

SHEET 1 of 1

CLIENT: Southern Hospitality Services, Inc.

LOCATION: Bossier City, Louisiana

DATE: 2/27/06

SURFACE ELEV:

DRILLING METHOD(S): Rotary Wash

GROUNDWATER INFORMATION: Water was encountered at twenty-one (21) feet depth

FIELD DATA				LABORATORY DATA									
SOIL & ROCK SYMBOL	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT, %	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	MINUS NO. 200 SIEVE, %	COMPRESSIVE STRENGTH, KSF	FAILURE STRAIN (%)	CONFINING PRESSURE PSI	DESCRIPTION OF STRATUM
				31	86					1.451	5.0		Medium brown clay (CH)
				23	101	73	28	45		7.622	5.0		--Becoming very stiff
	5			25									
				34	87	72	27	45		1.768	5.0		--Changing to medium
				42									
	10												
				27	98	76	28	48		3.265	5.0		--Becoming stiff
	15												
				25									
	20		▼										23.5
	25		N=4	24					64				Loose brown sandy silt (ML)
													28.5
	30		N=4	23					34				Loose brown silty sand (SM)
			N=22	25									--Becoming firm
	35												38.5
	40		N=18	12					9				Firm tan and gray sand with silt (SP-SM)
			N=13	15									
	45												
	50		N=19	11									50.0
													Bottom of boring
	55												

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

REMARKS:

LOG OF BORING NO. B-4

PROJECT: Six Story Holiday Inn

SHEET 1 of 1

CLIENT: Southern Hospitality Services, Inc.

LOCATION: Bossier City, Louisiana

DATE: 2/27/06

SURFACE ELEV:

DRILLING METHOD(S): Rotary Wash

GROUNDWATER INFORMATION: No water encountered

FIELD DATA				LABORATORY DATA									
SOIL & ROCK SYMBOL	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT, %	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	MINUS NO. 200 SIEVE, %	COMPRESSIVE STRENGTH, KSF	FAILURE STRAIN (%)	CONFINING PRESSURE PSI	DESCRIPTION OF STRATUM
				19	106	83	30	53		8.089	5.0		Hard brown clay (CH)
				36	81					1.525	4.0		--Becoming medium
	5			19	108	65	26	39		7.622	5.0		--Changing to very stiff
				37									
				25	101	60	25	35		2.145	5.0		--Becoming stiff
	10												10.0
													Bottom of boring
	15												
	20												
	25												
	30												
	35												
	40												
	45												
	50												
	55												

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

REMARKS:

060354

MAXIM TECHNOLOGIES,INC.

LOG OF BORING NO. B-5

PROJECT: Six Story Holiday Inn

SHEET 1 of 1

CLIENT: Southern Hospitality Services, Inc.

LOCATION: Bossier City, Louisiana

DATE: 2/27/06

SURFACE ELEV:

DRILLING METHOD(S): Hand Auger

GROUNDWATER INFORMATION: No water encountered

FIELD DATA				LABORATORY DATA									DESCRIPTION OF STRATUM
SOIL & ROCK SYMBOL	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT, %	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	MINUS NO. 200 SIEVE, %	COMPRESSIVE STRENGTH, KSF	FAILURE STRAIN (%)	CONFINING PRESSURE PSI	
	0		P = 2.2	29		66	26	40					Stiff brown clay (CH)
			P = 1.7	29									
	5		P = 2.3	32									5.0
													Bottom of boring
	10												
	15												
	20												
	25												
	30												
	35												
	40												
	45												
	50												
	55												

REMARKS:

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

060354

MAXIM TECHNOLOGIES,INC.

LOG OF BORING NO. B-6

PROJECT: Six Story Holiday Inn

SHEET 1 of 1

CLIENT: Southern Hospitality Services, Inc.

LOCATION: Bossier City, Louisiana

DATE: 2/27/06

SURFACE ELEV:

DRILLING METHOD(S): Hand Auger

GROUNDWATER INFORMATION: No water encountered

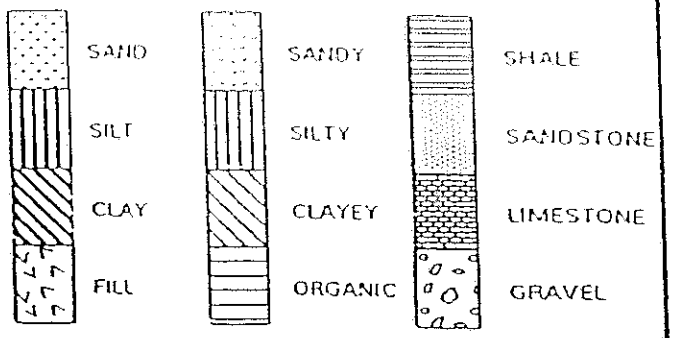
FIELD DATA				LABORATORY DATA									
SOIL & ROCK SYMBOL	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT, %	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	MINUS NO. 200 SIEVE, %	COMPRESSIVE STRENGTH, KSF	FAILURE STRAIN (%)	CONFINING PRESSURE PSI	DESCRIPTION OF STRATUM
	0		P=0.4	42		70	27	43					Soft brown clay (CH)
			P=0.9	42									--Becoming medium
	5		P=1.1	33									5.0 Bottom of boring
	10												
	15												
	20												
	25												
	30												
	35												
	40												
	45												
	50												
	55												

REMARKS:

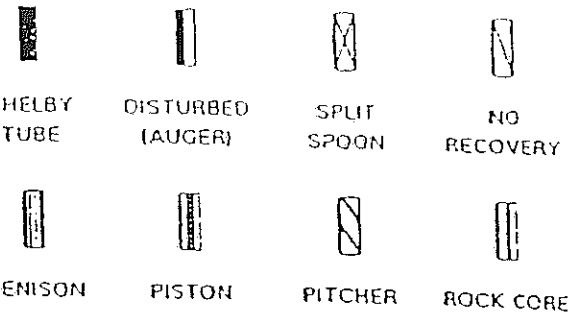
TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

KEY TO SOIL CLASSIFICATION TERMS AND SYMBOLS

SOIL OR ROCK TYPES



SAMPLER TYPES



CONSISTENCY OF COHESIVE SOILS (MAJOR PORTION PASSING NO. 200 SIEVE)

DESCRIPTIVE TERM	UNDRAINED SHEAR STRENGTH, KIPS/SQ FT
VERY SOFT	LESS THAN 0.25
SOFT	0.25 TO 0.5
FIRM	0.5 TO 1.0
STIFF	1.0 TO 2.0
VERY STIFF	2.0 TO 4.0
HARD	GREATER THAN 4.0

RELATIVE DENSITY OF GRANULAR SOILS (MAJOR PORTION RETAINED ON NO. 200 SIEVE)

DESCRIPTIVE TERM	RELATIVE DENSITY, %
VERY LOOSE	LESS THAN 15
LOOSE	15 TO 35
MEDIUM DENSE	35 TO 65
DENSE	65 TO 85
VERY DENSE	GREATER THAN 85

WATER LEVELS

▼ - DEPTH GROUNDWATER FIRST ENCOUNTERED DURING DRILLING

▽ - GROUNDWATER LEVEL AFTER 24 HOURS (UNLESS OTHERWISE NOTED)

TERMS DESCRIBING SOIL STRUCTURE

Parting: paper thin in thickness

Seam: 1/8" - 3" in thickness

Layer: greater than 3" in thickness

Calcareous: containing appreciable quantities of calcium carbonate

Ferrous: containing appreciable quantities of iron

Well-graded: having wide range in grain size & similar proportions of all intermediate sizes

Poorly graded: predominately one grain size or having a range of sizes with few or no particles of some intermediate sizes

Fissured: containing shrinkage cracks, frequently filled with fine sand or silt, usually more or less vertical

Interbedded: composed of alternate layers of different soil types

Laminated: composed of thin layers of varying color and texture

Slickensided: having inclined planes of weakness that are slick & glossy in appearance

NOTE: Clays possessing slickensided or fissured structure may exhibit lower measured shear strength than indicated by the described consistency. The consistency of such soil is interpreted using the measured shear strength along with pocket penetrometer results.

APPENDIX B

SPECIFICATION SHEETS

SPECIFICATIONS FOR COMPACTION OF SANDY CLAY AND CLAYEY SAND SOILS

The thickness of lifts used should be no more than the height of the teeth on sheepsfoot rollers. Generally, for a forty-eight (48) inch diameter or smaller drum roller, the maximum compacted lift thickness acceptable is six (6) inches. For rollers with drums of sixty (60) inches in diameter and larger with teeth about nine (9) inches long, a nine (9) inch final compacted lift thickness will be acceptable. The sole determination of the thickness of a lift will be the capability of the contractor's equipment to obtain the required compaction.

When obtaining the average density of a lift to determine its conformance to specifications, the lift should be immediately rejected if any density is more than 2% below the required average.

Generally, sheepsfoot rollers are most suitable for compaction of sandy clay and clayey sand soils, the contractor may use spiketooth rollers, rubber tired rollers, or any fill compaction equipment that has sufficient mass to compact the soil. Generally, the drums of sheepsfoot rollers should be filled with water or for additional weight with both water and sand. Tractors or other vehicles used primarily for hauling WILL NOT be allowed as fill compaction equipment. The contractor should also have smooth wheel rollers to seal the working area at the end of the day's operations so overnight rains will not saturate the soil and delay his work. These rollers should also be used to seal the surface whenever rainfall is imminent. A soils engineer should instruct the contractor to modify or remove from the site any equipment that in his opinion is not capable of compacting the fill to the required density.

The soil engineer or his representative will be on the site during all working hours and will accept or reject a lift within two (2) hours after being requested. No material will be placed on any lift that has not been accepted by the engineer.

After completion of the work, the owner will have the site surveyed. Any areas that are ½ inch (0.04 feet) or more below the desired grade will have the volumes computed thereon and payments for the missing material deducted from the amounts due the contractor. These deductions will be computed at the rate bid per cubic yard for all material missing.

COARSE AGGREGATE SPECIFICATIONS

Crushed Stone:
Crushed Concrete:

Crushed stone base course shall be composed of crusher-run broken stone. The material shall be crushed and consist of durable particles of stone mixed with approved soil binder material.

Gradation:

The base material shall meet the following requirements:

Pass #1-1/2"	-	100%
Pass #1"	-	90%-100%
Pass #3/4"	-	70% -100%
Pass #4	-	35% - 65%
Pass #40	-	12% - 32%
Pass #200	-	5% - 12%

Soil Binder:

Material passing the No. 40 sieve shall be known as "soil binder" and shall meet the following requirements. Plasticity Index < 15.

Compaction:

Compaction shall be obtained by a minimum of 12 passes of a 5,000 pound sheepfoot roller 3 to 4 feet wide. Surface shall be finished rolled by sufficient passes of a steel wheel roller to provide a smooth surface for application of the surface course.

Note:

Extra binder material may be added with the approval of the geotechnical or design engineer.

Soundness and Los Angeles abrasion tests should meet LaDOTD Specifications.

GEOTEXTILE FABRIC SPECIFICATIONS

The following proven woven Geotextile Fabrics are approved:

1. Amoco 2006
2. Beltech Style 980
3. ConTech C300
4. Mirafi 600X
5. Terra Tex HD

If alternate geotextile fabric from above is requested, the following qualifications should be met:

SPECIFICATIONS

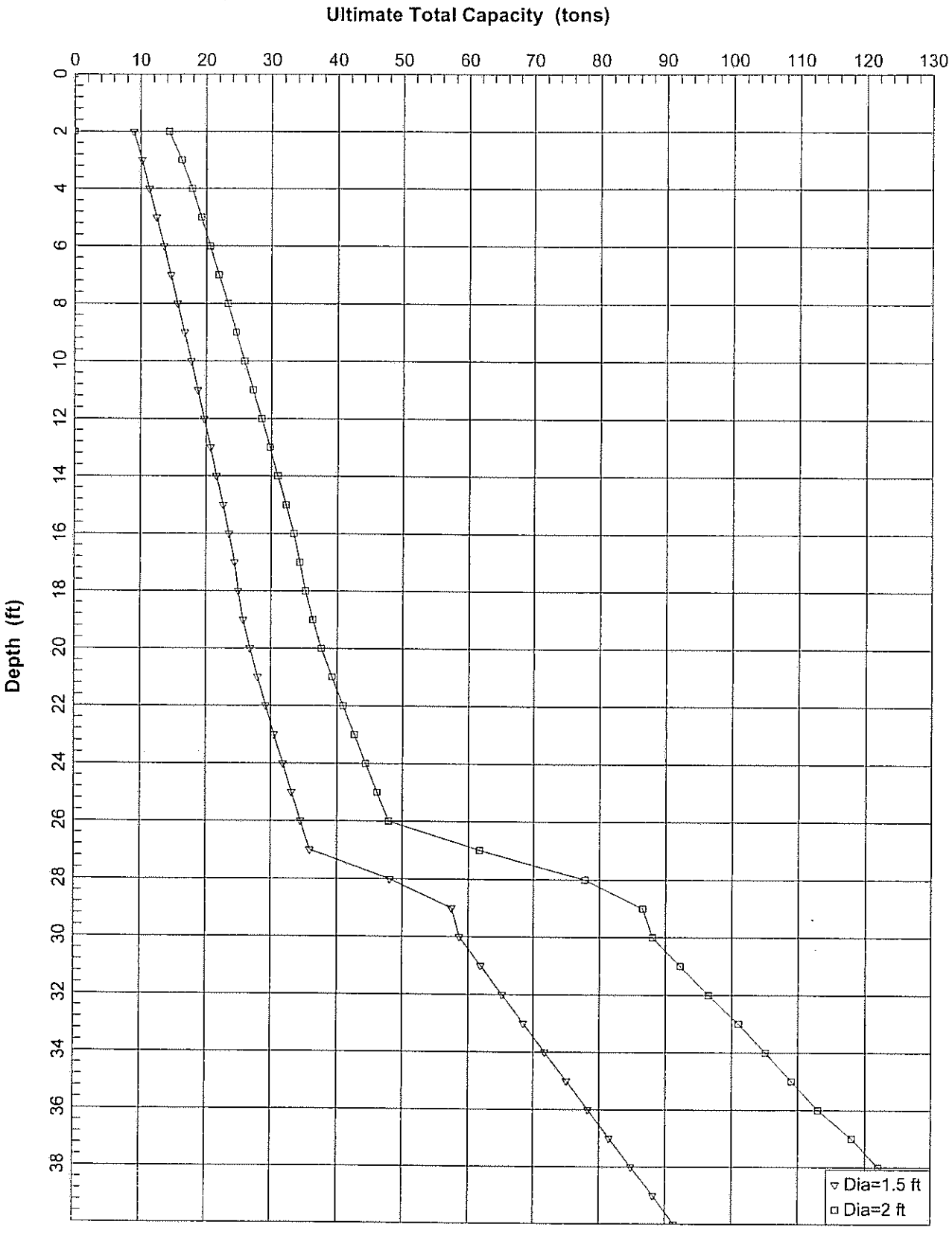
Property	Test Method	Minimum Requirements
Fabric Structure	-	Woven
Polymer Composition	-	Polypropylene
Fabric Width	-	12½',15',17½'
Weight	ASTM D-3776C	5 oz./yd.
Grab Strength	ASTM D-4632	300 x 300 lbs.
Elongation	ASTM D-4632	20%
Trap Tear Strength	ASTM D-4533	115 lbs. x 115 lbs.
Burst Strength	ASTM D-3786	575 psi.
Puncture	ASTM D-4833	120 lbs.
UV Resistance	ASTM D-4355	> 70%
A.O.S.	ASTM D-4751	35

NOTE:

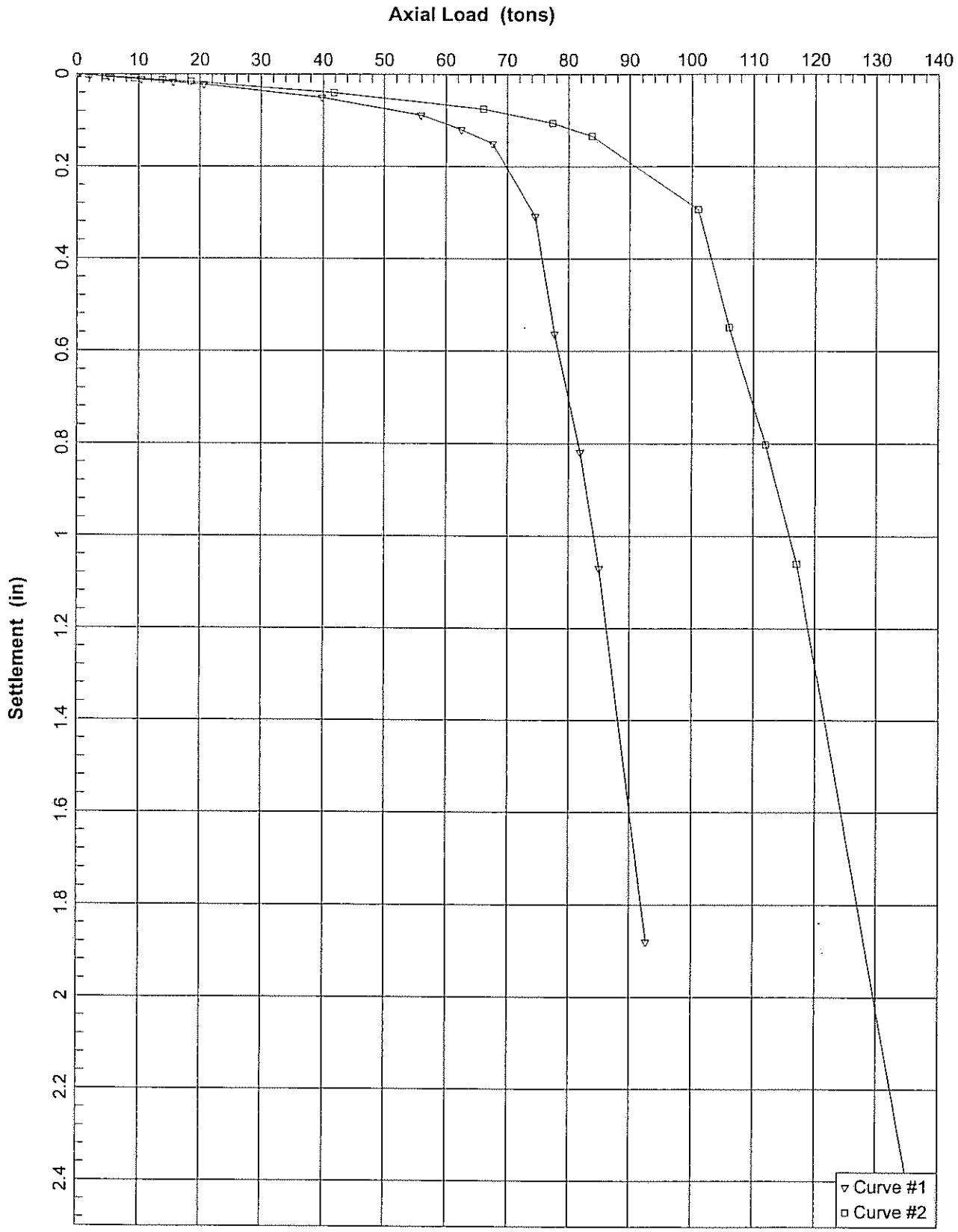
1. REQUIRES MILL CERTIFICATION FROM MANUFACTURER.
2. Minimum requirements are not minimum average values. Minimum average values per roll are not an acceptable specification.

APPENDIX C

DRILLED SHAFT CAPACITIES & SETTLEMENT

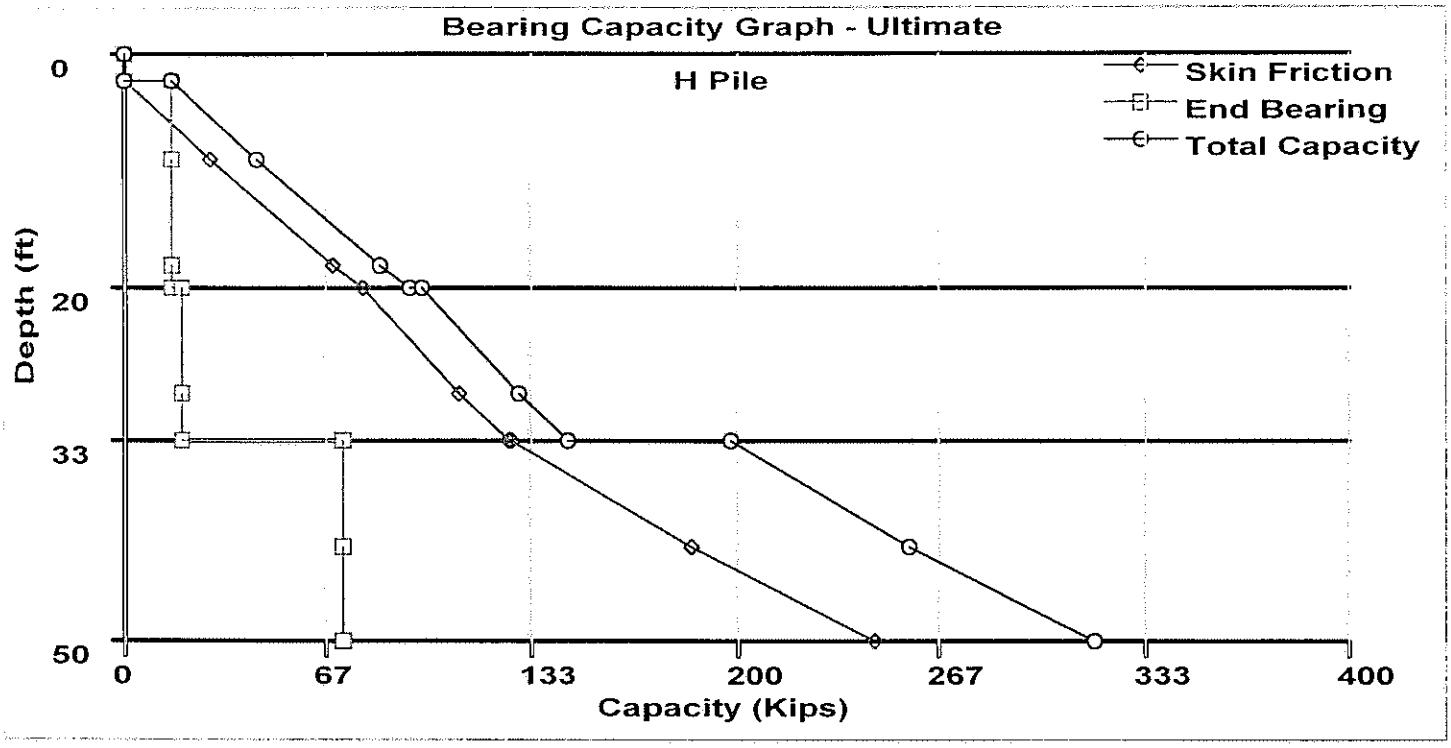


HOLIDAY INN BOSSIER- AUGERCAST PILES



HOLIDAY INN BOSSIER- AUGERCAST PILES

Filename:


Bearing Capacity Graph - Ultimate
H Pile
Skin Friction
End Bearing
Total Capacity
Depth (ft)
0
20
33
50
0
67
133
200
267
333
400
Capacity (Kips)

ULTIMATE - SKIN FRICTION

Depth	Soil Type	Effective Stress At Midpoint	Sliding Friction Angle	Adhesion	Skin Friction
0.01 ft	Cohesive	N/A	N/A	0.00 psf	0.00 Kips
2.49 ft	Cohesive	N/A	N/A	0.00 psf	0.00 Kips
2.50 ft	Cohesive	N/A	N/A	904.00 psf	0.00 Kips
9.01 ft	Cohesive	N/A	N/A	904.00 psf	28.24 Kips
18.01 ft	Cohesive	N/A	N/A	919.88 psf	68.47 Kips
19.99 ft	Cohesive	N/A	N/A	929.73 psf	78.04 Kips
20.01 ft	Cohesionless	2025.84 psf	23.38	N/A	78.12 Kips
29.01 ft	Cohesionless	2240.04 psf	23.38	N/A	109.99 Kips
32.99 ft	Cohesionless	2334.76 psf	23.38	N/A	126.03 Kips
33.01 ft	Cohesionless	2644.66 psf	26.76	N/A	126.13 Kips
42.01 ft	Cohesionless	2881.36 psf	26.76	N/A	185.00 Kips
49.99 ft	Cohesionless	3091.24 psf	26.76	N/A	245.29 Kips

ULTIMATE - END BEARING

Depth	Soil Type	Effective Stress At Tip	Bearing Cap. Factor	Limiting End Bearing	End Bearing
0.01 ft	Cohesive	N/A	N/A	N/A	0.00 Kips
2.49 ft	Cohesive	N/A	N/A	N/A	0.00 Kips
2.50 ft	Cohesive	N/A	N/A	N/A	15.54 Kips
9.01 ft	Cohesive	N/A	N/A	N/A	15.54 Kips
18.01 ft	Cohesive	N/A	N/A	N/A	15.54 Kips
19.99 ft	Cohesive	N/A	N/A	N/A	15.54 Kips
20.01 ft	Cohesionless	2026.08 psf	23.16	19.16 Kips	19.16 Kips
29.01 ft	Cohesionless	2454.48 psf	23.16	19.16 Kips	19.16 Kips
32.99 ft	Cohesionless	2643.92 psf	23.16	19.16 Kips	19.16 Kips
33.01 ft	Cohesionless	2644.93 psf	47.20	71.92 Kips	71.92 Kips
42.01 ft	Cohesionless	3118.33 psf	47.20	71.92 Kips	71.92 Kips
49.99 ft	Cohesionless	3538.07 psf	47.20	71.92 Kips	71.92 Kips

ULTIMATE - SUMMARY OF CAPACITIES

Depth	Skin Friction	End Bearing	Total Capacity
0.01 ft	0.00 Kips	0.00 Kips	0.00 Kips
2.49 ft	0.00 Kips	0.00 Kips	0.00 Kips
2.50 ft	0.00 Kips	15.54 Kips	15.54 Kips
9.01 ft	28.24 Kips	15.54 Kips	43.78 Kips
18.01 ft	68.47 Kips	15.54 Kips	84.01 Kips
19.99 ft	78.04 Kips	15.54 Kips	93.57 Kips
20.01 ft	78.12 Kips	19.16 Kips	97.28 Kips
29.01 ft	109.99 Kips	19.16 Kips	129.15 Kips
32.99 ft	126.03 Kips	19.16 Kips	145.19 Kips
33.01 ft	126.13 Kips	71.92 Kips	198.06 Kips
42.01 ft	185.00 Kips	71.92 Kips	256.93 Kips
49.99 ft	245.29 Kips	71.92 Kips	317.21 Kips

SECTION 00500

AGREEMENT

FORM OF AGREEMENT

1.01 AIA Document A101, Owner-Contractor Agreement Form - Stipulated Sum 1997 Edition, forms the basis of Contract between the Owner and Contractor.

END OF AGREEMENT

SECTION 00600

BONDS AND CERTIFICATES

GENERAL

1.01 SECTION INCLUDES

A. The following forms will be used during the construction of this Project. It shall be the Contractor's responsibility to obtain copies of these forms for his use.

1.02 FORMS AND CERTIFICATES

A. File with Owner prior to starting work:
   1. Certificate of Insurance: Document provided by Insurance Underwriter.
   2. Performance Bond and Payment Bond: AIA Document A312; December 1984 Edition

B. Construction changes (Cost and/or Time):
   1. Change Order: AIA Document G701-2000 Edition

C. Contractor to submit for progress payments and final payment:
   1. Application and Certificate for Payment: AIA Document G702 and G703: 1992 Edition.

D. Architect will prepare at Substantial Completion:
   1. Certificate of Substantial Completion: AIA Document G704.

E. Closeout Documents to be filed with the Owner in accordance with Section 01700
   1. Contractor’s Affidavit of Payment of Debts and Claims: AIA Document G706; 1994 Edition.
   2. Contractor’s Affidavit of Release of Liens: AIA Document G706A; 1994 Edition
   3. Consent of Surety Company to Final Payment: AIA Document G707; 1994 Edition.

END OF BONDS AND CERTIFICATES

SECTION 00700

GENERAL CONDITIONS

FORM OF GENERAL CONDITIONS

1.01 AIA Document A201, General Conditions of the Contract for Construction, 1997 Edition, attached, is the General Conditions between the Owner and Contractor.

1.02 The Contractor and all persons whom he may employ or contract to do the work on this project, shall be bound by these General Conditions as if repeated in each Section of this Project Manual.

1.03 The failure on part of the Contractor to familiarize himself, or examine these Documents, will in no way relieve him of the responsibilities and conditions set out herein.

SUPPLEMENTARY CONDITIONS

2.01 Refer to Document 00800 for amendments to these General Conditions.

END OF DOCUMENT

SECTION 00800

SUPPLEMENTARY CONDITIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Applicable provisions of the General Conditions and or Division 1. General Requirements govern all work in this Section.

1.02 SUPPLEMENTARY CONDITIONS

A. The following supplements modify, change, delete from or add to the "General Conditions of the Contract for Construction, AIA Document A201, 1997 Edition. Where any Article of the General Conditions is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

1.03 ARTICLE I: GENERAL PROVISIONS

A. Paragraph 1.1.2 is modified by the provision that the Contract Documents, the Agreement between Owner and Contractor, and any other agreements by or between any of the parties to the Contract for Construction or with any Subcontractor, the Surety, supplier or any third-party as a result of the Contract for Construction or other agreements and arrangements shall not construed to create any duty or responsibility by the Architect to any of these parties.

B. Add to 1.1 the following Subparagraph 1.1.8:
   1. 1.1.8 Products; The term "product" as used in these Specifications and Supplementary Conditions includes materials, systems and equipment.

C. Add to 1.5 the following Subparagraph 1.5.3:
   1. 1.5.3 If there he any conflicts between portions of the Contract Documents, not corrected by Addendum before the signing of the Contract, the Architect shall be notified upon discovery of such conflict for an interpretation.

1.04 ARTICLE 3: CONTRACTOR

A. Add to 3.2 the following Subparagraph 3.2.4:
   1. 3.2.4 Submission of proposal shall be deemed evidence that the Contractor has examined the site and is familiar with conditions under which the Work will be done. Extra payment will not be authorized for work that could have been determined by careful examination of the site and conditions.

B. Add to 3.4 the following Subparagraphs 3.4.4 and 3.4.5:
   1. 3.4.4 The Contractor shall disclose the existence and extent of financial interests, whether direct or indirect, he has in subcontractors and material suppliers which he may propose for the Project,
   2. 3.4.5 Products are generally specified by ASTM or other reference standards, and/or by manufacturer's name and model number or trade name. When specified only by reference standard, the Contractor may select any product meeting this standard, by any manufacturer. When several products or manufacturers are specified as being equally acceptable, the Contractor has the option of using any product and manufacturer combination listed. When only one product and manufacturer is specified, this is the basis of the Contract, without substitution or exception.

C. Add to 3.7 the following Subparagraphs 3.7.5 and 3.76:
   1. 3.7.5 The Contractor shall pay for any damages to sidewalks, streets or other public utilities,
   2. 3.7.6 The Contractor shall secure all certificates of inspection which may be required by authorities having jurisdiction over the Work. These shall be delivered to the Architect upon completion of the Work. Certificates of Use and Occupancy shall be obtained by the Contractor, as required by the Local Building Code, as a condition precedent to final payment.

D. In Paragraph 3.10.1, change the word “promptly” to “within five (5) days after the effective date of the Agreement” and add the following sentence:
   1. The progress schedule shall be brought up to date each month and a copy submitted along with the request for monthly payment.

E. Add to 3.12 the following Subparagraphs 3.12.11 and 3.12.12:
   1. 3.12.11 Shop drawings and samples shall he dated and marked to show the names of the Project, Architect, Contractor, origination Subcontractor, manufacturer or supplier and separate details if pertinent. Shop drawings shall completely identify Specification section and location at which materials or equipment are to be installed. Reproductions of Contract Drawings are acceptable as shop drawings only when specifically authorized in writing by the Architect.
   2. 3.12.12 Unless otherwise specified, the number of samples and the number of shop drawings which the Contractor shall submit and, if necessary, resubmit shall he five (5).

1.05 ARTICLE 4; ADMINISTRATION OF THE CONTRACT

A. Add to 4.2 the following Subparagraph 4.2.14:
   1. 4.2.14 No changes shall he made to the Drawings or Project Manual without written approval from the Architect.

1.06 ARTICLES; SUBCONTRACTORS

A. Subparagraph 5.2.1 is modified by the following provisions:
   1. Not later than five (5) days from the Contract Date, the Contractor shall provide a list of all subcontractors and major material suppliers that he proposes to use. After this list has been approved, no deviations will be permitted, unless by written approval by the Architect.

1.07 ARTICLE 7; CHANGES IN THE WORK

A. In Subparagraph 7.3.3 delete Clause .1 and substitute the following in lieu thereof:
   1. 7.3.3.1 by lump sum properly itemized, which shall show the actual verified cost of the Work, plus overhead and profit.

B. In Subparagraph 7.3.6 in the fourth and fifth lines, delete the words “a reasonable allowance for overhead and profit’ and substitute an allowance for overhead and profit in accordance with Subparagraph 7.3.10 below” in lieu thereof.

C. Add to 7.3 the following Subparagraph 7.3.10:
   1. 7.3.10 In Article 7 the allowance for overhead and profit, included in the total cost to the Owner, shall be based on the following (or as provided in the Agreement Between the Owner and the Contractor):
   2. 7.3.10.1 for the Contractor or Subcontractor performing work with their own forces, the allowance shall be 7% overhead and 5% profit.
   3. 7.3.10.2 for the Contractor, for Work performed by the Contractor’s Subcontractors, the allowance shall be 5% profit on the amount due the Subcontractor.
   4. 7.3.10.3 cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.6 of the General conditions.

5. 7.3.10.4 in order to facilitate checking of quotations for extras or credits, all proposals shall he accompanied by a complete itemization of costs of all Work including labor, materials and equipment, plus the allowance for overhead and profit.

1.08 ARTICLE 8; TIME

A. Add to 8.1 the following Subparagraph 8.1.5:
   1. 8.1.5 As between the Owner and the Contractor: as to all acts or failures to act occurring prior to the relevant Date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such Date of Substantial Completion; as to all acts or failures to act occurring subsequent to the relevant Date of Substantial Completion, any applicable statute of imitations shall commence to run and any alleged cause of action shall he deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment.

1.09 ARTICLF 9; PAYMENTS AND COMPLETION

A. Change Subparagraph 9.2.1 to read as follows:
   1. 9.2.1 Within five (5) days after execution of the Contract, the Contractor shall submit for approval a breakdown of the Contract Sum. Prepare the breakdown on AIA Document g702 and G703. The breakdown shall be prepared in such a manner that each major item of work and each subcontract item of work is shown as a single line item on the form.

B. Add to Subparagraph 9.3.1 the following sentence:
   1. Beginning with the second Application for Payment, the Contractor shall furnish with his application, certification that he has paid his subcontractors and major material suppliers the amounts drawn on the previous estimate for the respective items.

C. Add to Subparagraph 9.3.1 the following Clauses 9.3.1.3 and 9.3.1.4:
   1. 9.3.1.3 Until 50% completion, the Owner will pay 90% of the amount due the Contractor on account of progress payments. If at this 50% completion, the manner of completion of the Work and its progress are and remain satisfactory to the Architect and Owner, and in the absence of other good and sufficient reasons, the Architect will increase the payments to 95 % of the amount due the Contractor.
   2. 9.3.1.4 The full Contract retainage may be reinstated if the manner of completion of the Work and its progress do not remain satisfactory to the Architect and Owner, or if the Surety withholds his consent or for other good and sufficient reasons as determined by the Architect.

1.10 ARTICLE 11; INSURANCE AND BONDS

A. In Subparagraph 11.1.1 in the first line following the word “maintain”, insert the words “in a company or companies licensed to do business in the State where the Project is located”.

B. Add to Subparagraph 11.1.2 the following sentences:
   1. The Contractor shall maintain throughout the life of this Contract, liability insurance written in a comprehensive form, satisfactory to the Owner in the following minimum requirements. These are minimum requirements, and the Contractor shall determine the amounts of coverage required to protect himself from claims and damages. At least thirty (30) days prior to beginning construction and at any time a change is made in the insurance coverage, the Licensee shall comply with the Franchise License Agreement, currently including provision of an original certificate of insurance as evidence of insurance coverage to be effective during the construction period, and of payment of legal defense costs and compensatory damages for which the Licensee may he legally liable, by reason of occurrences on or off the Licensee’s premises.

C. Add to Subparagraph 11.1.2 the following clauses:

1. The Public/Auto Liability may he satisfied by any combination of primary, umbrella and/or excess policies. The insurance requirements, including minimum amounts of coverage, currently are as follows. Provide thirty (30) day written notice to Hilton Hotels, Inc. prior to the termination, expiration, reduction or cancellation of any of the policies listed below. Submit a certificate of insurance showing the renewal or extension of the policy thirty (30) days prior to expiration of any of the policies listed below and with Hotel name typed on the certificate of insurance.
2. Policies shall he issued by insurance companies with a rating by AM. Best Company of "A VI" or better.
3. Insurance coverage shall include at least the following categories and liability amounts:
   a. Commercial General Liability Insurance (CGL);
      1) $10 million per occurance
   b. Auto Liability;
      1) $2 million combined single limit (owned, non-owned & hired vehicles)
   c. Statutory Workers' Compensation;
      1) $1 million per accident
      2) $1 million per disease policy limit
      3) $1 million per disease each employee
   d. All Risk Property Insurance; Replacement Cost plus net profits and continuing expenses (including franchise fees);
   e. This All Risk insurance shall cover storm, flood, wind, earthquake, fire, vandalism, theft and malicious mischief. The policy shall be written on a replacement cost basis. The policy shall name the Owner, Contractor, all un-named subcontractors and Architect as insured. The loss, if any, is to he made adjustable and payable to the Owner, Contractor, the Lending Institution, Subcontractors, and any Affiliated or Associated companies. The deductible shall be the responsibility of the Contractor. Furnish insurance in sufficient amount to cover the value of work installed, the building materials, supplies and construction equipment at the project site and the Owner's furniture, fixtures and equipment after it reaches the project site against the named perils.
   f. Each of the Public and Auto Liability policies shall name as additional insureds those listed in the paragraph below by including a clause containing the following express language:
   g. Hilton Hotels Corporation, Hilton Inns, Inc., and any subsidiaries and affiliates of these companies, including their employees, officers and directors, now existing or which may hereafter exist as additional insureds

D. 11.5.1. Modify to read:

1. 11.5.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder. Bonds may be obtained through the Contractor's usual source and the cost thereof shall be included in the Contract Sum. The amount of each bond shall he equal to 100 percent of the Contract Sum. The Surety Company shall be acceptable to the Owner, the Architect and the Owner's Lending Institution.

E. Add to 11.5 the following Subparagraphs 11.5.3, 11.5.4, 11.5.5, 11.5.6 and 11.5.7:

1. 11.5.3 The Contractor shall furnish a Surety Bond for the full amount of the Contract Price, covering faithful performance of the Contract and the payment of all obligations arising thereunder. The premium for this Bond shall be paid by the Contractor.

2. 11.5.4 The Surety Bond shall be written by a Surety Company licensed to transact business in the State where the Project is located. The Surety Company shall be acceptable to the Owner, Architect and the Owner's Lending Institution. The Contractor shall verify the Surety Company's acceptability prior to the submittal of bids and shall be responsible for all costs resulting from the rejection of any proposed Surety Company.
3. 11.5.5 The Bond shall be delivered to the Owner within 5 days from the date of the Construction Agreement. The obtaining by the Contractor of the Bond shall be a condition precedent to the effectuation of the Contract between the Owner and the Contractor. The Surety Bond shall be AIA Document A312.
4. 11.5.6 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.
5. 11.5.7 If a surety bond is provided as stipulated herein and any claim is made against the surety bond, then the Owner, the Contractor, any Subcontractor, the Surety and any third-party as a result of this Agreement hereby agree to indemnify, defend and hold the Architect, his employees, representatives, agents and consultants harmless from any claims, disputes, damages. losses, costs and expenses, including attorney's fees. Litigation expenses and expert witness tees, and to waive all claims for damages against the Architect, his employees, representatives, agents and consultants for any increase in the cost or time of construction arising out of, or resulting from any act, neglect or omission of the Architect, his employees, representatives, agents amid consultants.

F. Add the following Clause 12.2.2.4 to Subparagraph 12.2:
1. 12.2.2.4 Upon request by the Owner and prior to the expiration, on one year from date of Substantial Completion, the Architect will conduct and the Contractor shall attend a meeting with the Owner to review the facility operations and performance.

END OF SECTION

SECTION 01100

SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: Holiday Inn Millennium.
   1. Location: Colonial Heights, VA

B. Owner's Name: Southern Hospitality Services.

C. Architect's Name: LLW Architects.

D. The Project consists of the construction of a new Hotel.

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00500 - Agreement.

1.03 WORK RESPONSIBILITY MATRIX

A. The "Work Responsibility Matrix" if attached herein may supercede any of the following requirements listed below. For any conflicting requirements the Architect shall be contacted for clarification.

1.04 WORK BY OWNER

A. Items noted NIC (Not in Contract) will be supplied and installed by Owner before Substantial Completion.
   1. Furnishings.
   2. Small equipment.

B. Owner will supply and install the following:
   1. Such items will be unloaded by the Owner at the job site. The Owner will provide temporary storage for all such items. Once such items are inside the building, the Contractor's insurance shall be extended to cover these items. The Owner will schedule and coordinate delivery and installation with the Contractor. The following items will be furnished and installed by the Owner:
      a. Furniture and Furnishings (blocking by Contractor).
      b. Shower Curtains (blocking by Contractor).
      c. Floor and Table Lamps.
      d. Wall-Mounted Light Fixtures in Guest Rooms (blocking by Contractor).
      e. Draperies and Drapery Tracks (blocking by Contractor)
      f. Television Wiring (Contractor to provide conduit with pull).
      g. Telephone and Data Wiring (Contractor to provide conduit with pull)
      h. Card Holder (Back of Room Door)
      i. Framed mirrors in Guestroom Rooms/Baths and Public Baths.
      j. Hair Dryers (blocking by Contractor)
      k. Iron and Ironing Board in Guestrooms (blocking by Contractor)
      l. Washer and Dryers Laundry Equipment and Guest Laundry Equipment, including floor mounting devices (roughins and final hook-up by Contractor)
      m. Front Desk Equipment
      n. Life Safety Signage
      o. Vending Machines
      p. Door Plaques
      q. Door Signage

r. Communications Dish
s. Employee Lounge, Pantry and Prep area Appliances and Equipment (roughins and final hook-up by Contractor).
t. Ice Machines (roughins and final hook-up by Contractor)
u. Safety Deposit Boxes and Floor Safe
v. Guest Suite Wet Bar appliances, employee lounge appliances (roughins and final hook-up by Contractor).
w. Audio-Visual Board in Meeting Rooms
x. Landscaping and Landscape Irrigation (4" min diameter PVC sleeves by Contractor).
y. Lockers
z. Safe
aa. Outdoor signage (Electrical Hook-up by Contractor)
ab. Exercise equipment
ac. Audio visual Board in Meeting Rooms

C. Owner will supply the following for installation by Contractor:
1. Such items will be unloaded by the Contractor at the job site. The Contractor will provide temporary storage for all such items. Once such items are inside the building, the Contractor's insurance shall be extended to cover these items. The Owner will schedule and coordinate delivery and installation with the Contractor. The following items will be furnished and installed by the Contactor:
a. Carpet
b. Wallcoverings

1.05 OWNER FURNISHED, CONTRACTOR INSTALLED ITEMS AND EQUIPMENT, RESPONSIBILITIES OF EACH PARIY

A. The Contractor shall cooperate with the Owner regarding delivery, storage and installation, coordination to minimize the inconvenience of each to the other. The Contractor will he required to provide conduit, cables, electrical wiring, outlets, panel boxes, water and gas lines, etc., as required to "hook up" equipment and render it operational. Owner's activities include final "plug-in" type connections only unless otherwise noted.

B. OFCI items will be will be unloaded by the Contractor at the project site. The Owner shall provide temporary storage for the items. Once items are on the project site, Contractor's insurance shall be extended to cover such items.

C. Such items will be unloaded by the Contractor at the job site. The Contractor will provide temporary storage or all such items. Once such items are inside the building, the Contractor's insurance shall be extended to cover these items. The Owner will schedule and coordinate delivery and installation with the Contractor.

D. Owner's Responsibilities:
1. Arrange for and deliver necessary shop drawings, product data and samples to the Contractor.
2. Arrange and pay for product delivery to the site.
3. Deliver supplier's bill of materials to Contractor, when required.
4. Submit claims for transportation damage.
5. Arrange for replacement of damaged, defective or missing items.
6. Arrange for manufacturer's warranties, bonds, service, and inspections, as required.

E. Contractor's Responsibilities:
   1. Designate delivery date for each Product in the Construction Schedule.
   2. Review shop drawings, product data and samples. Return such submittals to the Architect.
      a. Submit to Architect notification of any discrepancies or problems anticipated in the use of the product.
   3. Handle products at the site, including unloading, uncrating, storage and protection of the delivered items from damage. Contractor agrees to assume full responsiblility for, and insure all such items upon delivery.
   4. Inspect deliveries jointly with Owner.
   5. Assemble, install, connect, adjust and finish projducts, as stipulated in teh respective Section of the Specifications.
   6. Repair or replace items damaged by the Contractor or because of Contractor neglect.

1.06 OWNER OCCUPANCY

A. Owner intends to occupy the Project upon Substantial Completion.

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

C. Schedule the Work to accommodate Owner occupancy.

END OF SECTION

Holiday Inn - Millennium
Bossier City, LA

WORK RESPONSIBILITY MATRIX

ITEM DESCRIPTION	NOTES	DESIGN/ SELECT	FURNISHED BY	INSTALLED BY
LAND			Owner	
DESIGN AND ENGINEERING			Owner	
PERMITS, LICENSES and FEES				
Building Permits	GC to apply & procure		Owner	
Impact fees			Owner	
Business licenses			Owner	
CONSTRUCTION				
Exterior:				
All exterior lighting and bulbs		Architect	GC	GC
Electronic locks at exterior entries		Architect	GC	GC
Flag pole (s)		Architect	GC	GC
All landscaping and irrigation		Owner	Owner	Owner
All site work including special pavers		Architect	GC	GC
Terrace decks and fences		Architect	GC	GC
Lightning Protection		Architect	GC	GC
Irrigation Sleeves		Architect	GC	GC
Dumpster Enclosure		Architect	GC	GC
Interior: Public Areas				
Wall, base, floor and ceiling finishes		Architect	GC	GC
Vinyl wall covering		Owner	Owner	GC
VWC prep and adhesive		Architect	GC	GC
Doors, frames and hardware		Architect	GC	GC
Carpet, carpet base and pad		Owner	Owner	GC
Carpet / pad prep, adhesive, tack strips and installation		Architect	Owner/GC	GC
All millwork		Architect	GC	GC
Toilet room fixtures / trim / accessories		Architect	GC	GC
Janitor closet-all fixtures / utilities		Architect	GC	GC
Blocking for draperies		Architect	GC	GC
Built-in valance / drapery pockets		Architect	GC	GC

ITEM DESCRIPTION	NOTES	DESIGN/ SELECT	FURNISHED BY	INSTALLED BY
Meeting room & breakout room operable partitions		Architect	GC	GC
Fabric for operable partitions		Owner	Owner	GC
All permanent ornamental metals		Architect	GC	GC
Functional lighting and bulbs		Architect	GC	GC
Decorative lighting and bulbs		Architect	GC	GC
Indoor pool / all MEP equipment		Architect	GC	GC
Interior: Guest Rooms and Corridors				
Wall, base, floor, and ceiling finishes		Architect	GC	GC
Vinyl wall covering		Owner	Owner	GC
VWC prep and adhesive		Architect	GC	GC
Doors, frames, hardware		Architect	GC	GC
Electronic locks		Architect	GC	GC
Carpet, carpet base, and pad		Owner	Owner	GC
Carpet / pad prep, adhesive, tack strips and installation		Architect	Owner / GC	GC
All millwork		Architect	GC	GC
Drapery blocking		Architect	GC	GC
Headboard, mirror, artwork blocking		Architect	GC	GC
Closet shelf and rod		Architect	GC	GC
Toilet room fixtures / trim / accessories		Architect	GC	GC
Functional lighting		Architect	GC	GC
Decorative lighting		Architect	GC	GC
Framed decorative mirrors		Owner	Owner	Owner
Guest room floor vending / ice machines (Hook-up Ice machines by GC)		Owner	Owner	Owner
Ice machine water and drain		Architect	GC	GC
Corridor & Guestroom vinyl corner guards		Architect	GC	GC
Interior: Back of House				
Wall, base, floor and ceiling finishes		Architect	GC	GC
Vinyl wall covering		Owner	Owner	GC
VWC prep and adhesive		Architect	GC	GC
Corner guards/ wainscot FRP		Architect	GC	GC
Permanent wood storage shelves		Architect	GC	GC
Employee lockers / bases		Architect	GC	GC
Toilet room fixtures / trim / accessories		Architect	GC	GC
Functional lighting		Architect	GC	GC
Built-in counters and cabinets		Architect	GC	GC
Laundry equipment and connections (Final hook-up GC)		Owner	Owner	Owner

ITEM DESCRIPTION	NOTES	DESIGN/ SELECT	FURNISHED BY	INSTALLED BY
Laundry ductwork and exhaust		Architect	GC	GC
Kitchen / Room Service Prep / Food & Beverage Equipment (Final hook-up GC)		Owner	Owner	Owner
Carpet, carpet base, and pad		Owner	Owner	GC
Carpet / pad prep, adhesive, tack strips & installation		Architect	Owner/GC	GC
Safe deposit boxes		Owner	Owner	Owner
Interior Systems				
Cable for A/V, Sound and Security Systems		Architect	Owner	Owner
Conduit for A/V, Sound & Security Systems		Architect	GC	GC
MATV cable		Architect	Owner	Owner
Conduit & Boxes for MATV		Architect	GC	GC
Telephone cable		Architect	Owner	Owner
Conduit & Boxes for telephone		Architect	GC	GC
Computer cable		Architect	Owner	Owner
Computer conduit		Architect	GC	GC
Lighting Dimming system(s)		Architect	GC	GC
Emergency lighting (throughout)		Architect	GC	GC
All life safety systems		Architect	GC	GC
Fire extinguishers and cabinets		Architect	GC	GC
All M/E/P systems complete		Architect	GC	GC
Fire Sprinkler system complete		Architect	GC	GC
Elevator interior finishes		Architect	GC	GC
Time clock		Owner	Owner	Owner
FURNITURE, FIXTURES AND EQUIPMENT				
Exterior:				
Flag (s)		Owner	Owner	Owner
Miscellaneous portable planters & plants		Owner	Owner	Owner
Exterior trash and ash containers		Owner	Owner	Owner
Landscape maintenance equipment		Owner	Owner	Owner
Vehicles, vans, etc.		Owner	Owner	Owner
Terrace furniture		Owner	Owner	Owner
Entry mats		Owner	Owner	Owner
Dumpster		Owner	Owner	Owner
Interior: Public Areas				
Chalk and tack boards in meeting rooms & breakout rooms		Owner	Owner	Owner
Portable projection screens		Owner	Owner	Owner
Built-in projection screens		Architect	GC	GC

ITEM DESCRIPTION	NOTES	DESIGN/ SELECT	FURNISHED BY	INSTALLED BY
Furniture/ Televisions		Owner	Owner	Owner
Floor and table lamps		Owner	Owner	Owner
Interior plants/ash urns/ trash receptacle		Owner	Owner	Owner
Decorative framed mirrors		Owner	Owner	Owner
Artwork, artifacts and interior graphics		Owner	Owner	Owner
All window treatment and hardware		Owner	Owner	Owner
Business center equipment		Owner	Owner	Owner
Exercise room equipment		Owner	Owner	Owner
Guest laundry equipment		Owner	Owner	Owner
Graphics and signage		Owner	Owner	Owner
Sundries refrigerator & freezer		Owner	Owner	Owner
Interior: Guest Rooms and Corridors				
Furniture/Bedding/Bedspreads		Owner	Owner	Owner
Floor and table lamps		Owner	Owner	Owner
Interior plants		Owner	Owner	Owner
Decorative framed mirrors		Owner	Owner	Owner
Artwork, artifacts and interior graphics		Owner	Owner	Owner
All window treatment and hardware		Owner	Owner	Owner
TV/Radio/Coffee/Microwave/ Refrigerator		Owner	Owner	Owner
Hair dryers		Owner	Owner	Owner
Irons and Ironing boards		Owner	Owner	Owner
Guestroom accessories/amenities		Owner	Owner	Owner
Interior: Back of House				
Luggage carts, dollies, etc.		Owner	Owner	Owner
Maintenance department equipment		Owner	Owner	Owner
Housekeeping department equipment		Owner	Owner	Owner
Linen carts, vacuums, etc.		Owner	Owner	Owner
First aid cabinet and supplies		Owner	Owner	Owner
Kitchen / room service prep / food & beverage cooking utensils		Owner	Owner	Owner
Storage containers		Owner	Owner	Owner
Furniture and files		Owner	Owner	Owner
Administrative office equipment and supplies		Owner	Owner	Owner
Freestanding safe		Owner	Owner	Owner
Employee lounge microwave and refrigerator		Owner	Owner	Owner
Interior: Systems				
Telephone switch and instruments		Owner	Owner	Owner

ITEM DESCRIPTION	NOTES	DESIGN/ SELECT	FURNISHED BY	INSTALLED BY
Computer hardware and software		Owner	Owner	Owner
Point of sale system		Owner	Owner	Owner
On Command Video		Owner	Owner	Owner
Conduit for above		Architect	GC	GC
EXTERIOR SIGNS				
Building mounted signs (Blocking by General Contractor)		Owner	Owner	Owner
Ground mounted signs & Concrete Foundation		Owner	Owner	Owner
Electrical wiring/conduit/connection		Architect	GC	GC
Ground mounted sign base		Architect	GC	GC
OPERATING EQUIPMENT				
China/Glass/Linen/Silver/Uniforms		Owner	Owner	Owner
INVENTORIES		Owner	Owner	Owner
PRE-OPENING EXPENSES			Owner	
WORKING CAPITAL			Owner	
PROJECT MANAGEMENT			Owner	
INSURANCE & BOND			GC	
FINANCIAL, TAXES AND LEGAL			Owner	
CONTINGENCY			Owner	

SECTION 01200

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

1.02 RELATED SECTIONS

A. Document 00500 - Agreement: Contract Sum, retainages, payment period, monetary values of unit prices.

B. Document 00700 - General Conditions and Document 00800 - Supplementary Conditions: Additional requirements for progress payments, final payment, changes in the Work.

C. Document 00800 - Supplementary Conditions: Percentage allowances for Contractor's overhead and profit.

1.03 SCHEDULE OF VALUES

A. Submit a printed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet.

B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization.

D. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.

E. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Present required information in typewritten form.

C. Form: AIA G702 Application and Certificate for Payment and AIA G703 - Continuation Sheet including continuation sheets when required.

D. Execute certification by signature of authorized officer.

E. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products.

F. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.

G. Submit three copies of each Application for Payment.

H. Include the following with the application:
   1. Transmittal letter as specified for Submittals in Section 01300.
   2. Construction progress schedule, revised and current as specified in Section 01300.
   3. Partial release of liens from major Subcontractors and vendors.
   4. Affidavits attesting to off-site stored products.

I. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.05 MODIFICATION PROCEDURES

A. Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions on AIA Form G710.

B. Construction Change Directive: Architect may issue a document, signed by Owner, instructing Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
   1. The document will describe changes in the Work, and will designate method of determining any change in Contract Sum or Contract Time.
   2. Promptly execute the change in Work.

C. Proposal Request: Architect may issue a document which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days.

D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01600.

E. Computation of Change in Contract Amount:
   1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
   2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
   3. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.

F. Substantiation of Costs: Provide full information required for evaluation.
   1. On request, provide following data:
      a. Quantities of products, labor, and equipment.
      b. Taxes, insurance, and bonds.
      c. Overhead and profit.
      d. Justification for any change in Contract Time.
      e. Credit for deletions from Contract, similarly documented.
   2. Support each claim for additional costs with additional information:
      a. Origin and date of claim.
      b. Dates and times work was performed, and by whom.
      c. Time records and wage rates paid.
      d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract on AIA G701.

H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

J. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:
   1. All closeout procedures specified in Section 01700.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01300

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.

B. Site mobilization meeting.

C. Progress meetings.

D. Construction progress schedule.

E. Submittals for review, information, and project closeout.

F. Number of copies of submittals.

G. Submittal procedures.

1.02 RELATED SECTIONS

A. Document 00700 - General Conditions: Dates for applications for payment.

B. Document 00700 - General Conditions: Duties of the Construction Manager.

C. Section 01700 - Execution Requirements: Additional coordination requirements.

D. Section 01780 - Closeout Submittals: Project record documents.

1.03 PROJECT COORDINATION

A. Project Coordinator: Employed by the Contractor.

B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for site access, traffic, and parking facilities.

C. During construction, coordinate use of site and facilities through the Project Coordinator.

D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.

E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.

F. Coordinate field engineering and layout work under instructions of the Project Coordinator.

G. Make the following types of submittals to Architect through the Project Coordinator:
   1. Requests for interpretation.
   2. Requests for substitution.
   3. Shop drawings, product data, and samples.
   4. Test and inspection reports.
   5. Manufacturer's instructions and field reports.
   6. Applications for payment and change order requests.
   7. Progress schedules.
   8. Coordination drawings.
   9. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Architect will schedule a meeting after Notice of Award.

B. Attendance Required:
   1. Owner.
   2. Architect.
   3. Contractor.

C. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   3. Distribution of Contract Documents.
   4. Submission of list of Subcontractors, schedule of values, and progress schedule.
   5. Designation of personnel representing the parties to Contract, None - N/A, and Architect.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   7. Scheduling.
   8. Scheduling activities of a Geotechnical Engineer.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.02 SITE MOBILIZATION MEETING

A. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Contractor's Superintendent.
   5. Major Subcontractors.

B. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner's requirements.
   3. Construction facilities and controls provided by Owner.
   4. Temporary utilities provided by Owner.
   5. Survey and building layout.
   6. Security and housekeeping procedures.
   7. Schedules.
   8. Application for payment procedures.
   9. Procedures for testing.
   10. Procedures for maintaining record documents.
   11. Requirements for start-up of equipment.
   12. Inspection and acceptance of equipment put into service during construction period.

C. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.

D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems which impede planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Maintenance of progress schedule.
   7. Corrective measures to regain projected schedules.
   8. Planned progress during succeeding work period.
   9. Maintenance of quality and work standards.
   10. Effect of proposed changes on progress schedule and coordination.
   11. Other business relating to Work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 CONSTRUCTION PROGRESS SCHEDULE

A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
   1. Include written certification that major contractors have reviewed and accepted proposed schedule.

C. Within 10 days after joint review, submit complete schedule.

D. Submit updated schedule with each Application for Payment.

3.05 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01780 - CLOSEOUT SUBMITTALS.

3.06 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

3.07 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

B. Submit for Owner's benefit during and after project completion.

3.08 NUMBER OF COPIES OF SUBMITTALS

A. Documents for Review:
   1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches: Submit the number of copies which the Contractor requires, plus two copies which will be retained by the Architect.
   2. Larger Sheets, Not Larger Than 30" x 42" inches: Submit one reproducible transparency and one opaque reproduction.

B. Documents for Information: Submit two copies.

C. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.

D. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.09 SUBMITTAL PROCEDURES

A. Transmit each submittal with approved form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Deliver submittals to Architect at business address.

F. Schedule submittals to expedite the Project, and coordinate submission of related items.

G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

H. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

I. Provide space for Contractor and Architect review stamps.

J. When revised for resubmission, identify all changes made since previous submission.

K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

L. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01400

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Quality assurance submittals.

C. Mock-ups.

D. Control of installation.

E. Testing and inspection services.

F. Manufacturers' field services.

1.02 RELATED SECTIONS

A. Document 00300 - Information Available to Bidders: Soil investigation data.

B. Section 01300 - Administrative Requirements: Submittal procedures.

C. Section 01600 - Product Requirements: Requirements for material and product quality.

1.03 REFERENCES

A. ASTM C 1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2001.

B. ASTM C 1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2006a.

C. ASTM C 1093 - Standard Practice for Accreditation of Testing Agencies for Unit Masonry; 2006.

D. ASTM D 3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2004a.

E. ASTM E 329 - Standard Specification for Agencies Engaged Construction Inspection and/or Testing; 2007.

F. ASTM E 543 - Standard Specification for Agencies Performing Nondestructive Testing; 2006.

1.04 SUBMITTALS

A. Testing Agency Qualifications:
   1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.

B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

C. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.

e. Identification of product and specifications section.
f. Location in the Project.
g. Type of test/inspection.
h. Date of test/inspection.
i. Results of test/inspection.
j. Conformance with Contract Documents.
k. When requested by Architect, provide interpretation of results.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor to Architect, in quantities specified for Product Data.
1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

F. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.05 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 TESTING AND INSPECTION AGENCIES

A. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

C. Contractor Employed Agency:
   1. Testing agency: Comply with requirements of ASTM E 329, ASTM E 548, ASTM E 543, ASTM C 1021, ASTM C 1077, ASTM C 1093, and ASTM C 1021.
   2. Inspection agency: Comply with requirements of ASTM D290, ASTM D3740, ASTM E329, and ASTM E548.
   3. Laboratory: Authorized to operate in the State in which the Project is located.
   4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
   5. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups shall be a comparison standard for the remaining Work.

D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, remove mock-up and clear area when directed to do so.

3.03 TESTING AND INSPECTION

A. See individual specification sections for testing and inspection required.

B. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.

5. Perform additional tests and inspections required by Architect.
6. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency may not approve or accept any portion of the Work.
3. Agency may not assume any duties of Contractor.
4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.
2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
3. Provide incidental labor and facilities:
a. To provide access to Work to be tested/inspected.
b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
c. To facilitate tests/inspections.
d. To provide storage and curing of test samples.
4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect. Payment for re testing will be charged to the Contractor by deducting testing charges from the Contract Price.

3.04 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary telephone service.

C. Temporary sanitary facilities.

D. Temporary Controls: Barriers, enclosures, and fencing.

E. Security requirements.

F. Vehicular access and parking.

G. Waste removal facilities and services.

H. Project identification sign.

I. Field offices.

1.02 TEMPORARY UTILITIES

A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.

B. New permanent facilities may not be used.

C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TELEPHONE SERVICE

A. Provide, maintain, and pay for telephone service to field office at time of project mobilization.

B. Provide, maintain and pay for facsimile service and a dedicated telephone line to field office at time of project mobilization.

1.04 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

1.05 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.06 FENCING

A. Construction: Commercial grade chain link fence.

B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.07 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.08 SECURITY

A. Provide security and facilities to protect Work, and Owner's operations from unauthorized entry, vandalism, or theft.

1.09 VEHICULAR ACCESS AND PARKING

A. Coordinate access and haul routes with governing authorities and Owner.

B. Provide and maintain access to fire hydrants, free of obstructions.

C. Provide means of removing mud from vehicle wheels before entering streets.

D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.10 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site periodically.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.11 PROJECT IDENTIFICATION

A. Provide project identification sign of design and construction indicated on Drawings.

B. Erect on site at location indicated.

C. No other signs are allowed without Owner permission except those required by law.

1.12 FIELD OFFICES

A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack and drawing display table.

B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

1.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations and procedures.

E. Procedures for Owner-supplied products.

F. Spare parts and maintenance materials.

1.02 RELATED SECTIONS

A. Section 01100 - Summary: Lists of products to be removed from existing building.

B. Section 01400 - Quality Requirements: Product quality monitoring.

1.03 SUBMITTALS

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

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

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

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

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

PART 2 PRODUCTS

2.01 NEW PRODUCTS

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

B. Sustainably Harvested Wood:
   1. Definition: Wood-based materials include but are not limited to structural framing, dimension lumber, flooring, wood doors, finishes, and furnishings that are permanently installed in the project. Wood and wood-based products not permanently installed in the project are not included in the definition.
   2. Specific Wood-Based Fabrications: Fabricate of sustainably harvested wood when so specified elsewhere.
   3. Certification: Provide wood certified or labeled by an organization accredited by one of the following:
      a. The Forest Stewardship Council, The Principles for Natural Forest Management; for Canada visit http://www.fsccanada.org, for the USA visit http://www.fscus.org.

4. LEED Submittals: State unit cost of each wood-based item, quantity installed, quantity certified as sustainably harvested, total wood-based material cost, and total sustainably harvested value; provide letter of certification signed by supplier of each item, indicating compliance with the specified requirements and identifying the certifying organization.
    a. Include the certifying organization's certification numbers for each certified product, itemized on a line-item basis.
    b. Attach copies of invoices bearing the certifying organization's certification numbers.

2.02 PRODUCT OPTIONS

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

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

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

2.03 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra products of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

B. Architect will consider requests for substitutions only within 15 days after date of Agreement.

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

D. A request for substitution constitutes a representation that the submitter:
    1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
    2. Will provide the same warranty for the substitution as for the specified product.
    3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
    4. Waives claims for additional costs or time extension which may subsequently become apparent.
    5. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.

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

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

3.02 OWNER-SUPPLIED PRODUCTS

A. See Section 01100 - Summary for identification of Owner-supplied products.

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

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

3.03 TRANSPORTATION AND HANDLING

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

B. Transport and handle products in accordance with manufacturer's instructions.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

H. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01700

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pre-installation meetings.

B. Cutting and patching.

C. Surveying for laying out the work.

D. Cleaning and protection.

E. Starting of systems and equipment.

F. Demonstration and instruction of Owner personnel.

G. Closeout procedures, except payment procedures.

1.02 RELATED SECTIONS

A. Section 01300 - Administrative Requirements: Submittals procedures.

B. Section 01400 - Quality Requirements: Testing and inspection procedures.

C. Section 01500 - Temporary Facilities and Controls: Temporary exterior enclosures.

D. Section 01780 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
   3. Submit surveys and survey logs for the project record.

C. Cutting and Patching: Submit written request in advance of cutting or alteration which affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.
   6. Include in request:
      a. Identification of Project.
      b. Location and description of affected work.
      c. Necessity for cutting or alteration.
      d. Description of proposed work and products to be used.
      e. Alternatives to cutting and patching.
      f. Effect on work of Owner or separate Contractor.
      g. Written permission of affected separate Contractor.
      h. Date and time work will be executed.

D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.04 QUALIFICATIONS

A. For survey work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located.

1.05 PROJECT CONDITIONS

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water.

C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

D. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
   1. Minimize amount of bare soil exposed at one time.
   2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
   3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
   4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

E. Pest Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

F. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.06 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of work of separate sections.

G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01600.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Owner will locate and protect survey control and reference points.

D. Control datum for survey is that established by Owner provided survey.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

H. Utilize recognized engineering survey practices.

I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.

J. Periodically verify layouts by same means.

K. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 CUTTING AND PATCHING

A. Execute cutting and patching including excavation and fill to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to integrate with other work.

B. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing.

C. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

D. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

E. Restore work with new products in accordance with requirements of Contract Documents.

F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07840, to full thickness of the penetrated element.

H. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

I. Make neat transitions. Patch work to match adjacent work in texture and appearance.

J. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.09 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect and owner seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.11 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.12 FINAL CLEANING

A. Execute final cleaning after Substantial Completion but before making final application for payment.

B. Use cleaning materials that are nonhazardous.

C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Clean filters of operating equipment.

F. Clean debris from roofs, gutters, downspouts, and drainage systems.

G. Clean site; sweep paved areas, rake clean landscaped surfaces.

H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Architect.

B. Notify Architect when work is considered ready for Substantial Completion.

C. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's review.

D. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.

E. Notify Architect when work is considered finally complete.

F. Complete items of work determined by Architect's final inspection.

3.14 MAINTENANCE SERVICE

A. Furnish service and maintenance of components indicated in specification sections for one year from date of Substantial Completion.

B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED SECTIONS

A. Section 00700 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

B. Section 01300 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

C. Section 01700 - Execution Requirements: Contract closeout procedures.

D. Individual Product Sections: Specific requirements for operation and maintenance data.

E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish main floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Additional information as specified in individual product specification sections.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

E. Provide servicing and lubrication schedule, and list of lubricants required.

F. Include manufacturer's printed operation and maintenance instructions.

G. Include sequence of operation by controls manufacturer.

H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

I. Provide control diagrams by controls manufacturer as installed.

J. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

K. Include test and balancing reports.

L. Additional Requirements: As specified in individual product specification sections.

3.05 OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Prepare data in the form of an instructional manual.

C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
      a. Significant design criteria.
      b. List of equipment.
      c. Parts list for each component.
      d. Operating instructions.
      e. Maintenance instructions for equipment and systems.
      f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
   3. Part 3: Project documents and certificates, including the following:
      a. Shop drawings and product data.
      b. Air and water balance reports.
      c. Certificates.

3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

END OF SECTION

SECTION 02200 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Preparing and grading subgrades for slabs-on-grade, walks, pavements, and landscaping.
2. Excavating and backfilling for buildings and structures.
3. Drainage and moisture-control fill course for slabs-on-grade.
4. Subbase course for walks and pavements.
5. Subsurface drainage backfill for walls and trenches.
6. Excavating and backfilling trenches within building lines.
7. Excavating and backfilling for underground mechanical and electrical utilities and appurtenances.

B. Related Sections: The following Sections contain requirements that relate to this Section.

1. Division 2 Section "Site Clearing" for site stripping, grubbing, topsoil removal, and tree protection.
2. Division 2 Section "Landscape Work" for finish grading, including placing and preparing topsoil for lawns and planting.
3. Division 3 Section "Cast-In-Place Concrete" for concrete encasings, cradles, and appurtenances for utility systems.

1.3 DEFINITIONS

A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.

B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

C. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.

D. Subbase Course: The layer placed between the subgrade and base course in a paving system or the layer placed between the subgrade and surface of a pavement or walk.

E. Base Course: The layer placed between the subbase and surface pavement in a paving system.

F. Drainage Fill: Course of washed granular material supporting slab-on-grade placed to cut off upward capillary flow of pore water.

G. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Architect. Unauthorized excavation, as well as remedial work directed by the Architect, shall be at the Contractor's expense.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

I. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.4 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner or others except when permitted in writing by the Architect and then only after acceptable temporary utility services have been provided.

1. Provide a minimum 48-hours' notice to the Architect and receive written notice to proceed before interrupting any utility.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shutoff services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations.

B. Satisfactory Soil Materials: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM; free of rock or gravel larger than 2 inches (50 mm) in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.

C. Unsatisfactory Soil Materials: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.

D. Backfill and Fill Materials: Satisfactory soil materials.

E. Subbase and Base Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, ASTM D 2940, with at least 95 percent passing a 1-1/2 inch (38 mm) sieve and not more than 8 percent passing a No. 200 (75 micrometer) sieve.

F. Engineered Fill: Subbase or base materials.

G. Bedding Material: Subbase or base materials with 100 percent passing a 1 inch (25 mm) sieve and not more than 8 percent passing a No. 200 (75 micrometer) sieve.

H. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate grading size 57, with 100 percent passing a 1-1/2 inch (38 mm) sieve and not more than 5 percent passing a No. 8 (2.36 mm) sieve.

I. Filtering Material: Evenly graded mixture of natural or crushed gravel or crushed stone and natural sand, with 100 percent passing a 1-1/2 inch (38 mm) sieve and 0 to 5 percent passing a No. 50 (300 micrometer) sieve.

J. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility.

B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick minimum, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep.

1. Tape Colors: Provide tape colors to utilities as follows:

a. Red: Electric.
b. Yellow: Gas, oil, steam, and dangerous materials.
c. Orange: Telephone and other communications.
d. Blue: Water systems.
e. Green: Sewer systems.

C. Filter Fabric: Manufacturer's standard nonwoven pervious geotextile fabric of polypropylene, nylon or polyester fibers, or a combination.

1. Provide filter fabrics that meet or exceed the listed minimum physical properties determined according to ASTM D 4759 and the referenced standard test method in parentheses:

a. Grab Tensile Strength (ASTM D 4632): 100 lb (45 kg).
b. Apparent Opening Size (ASTM D 4751): #100 U.S. Standard (150 micrometer) sieve.
c. Permeability (ASTM D 4491): 150 gallons per minute per sq. ft. (102 L/s per sq. m).

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

C. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 DEWATERING

A. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

3.3 EXCAVATION

A. Explosives: Do not use explosives.

B. Unclassified Excavation: Excavation is unclassified and includes excavation to required subgrade elevations regardless of the character of materials and obstructions encountered.

C. Classified Excavation: Excavation is classified and includes excavation to required subgrade elevations. Excavation will be classified as earth excavation or rock excavation as follows:

3.4 STABILITY OF EXCAVATIONS

A. Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1.2 inches (30 mm). Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Appurtenances: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1.2 inches (30 mm). Do not disturb bottom of excavations intended for bearing surface.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated slopes, lines, depths, and invert elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit, unless otherwise indicated.

1. Clearance: 12 inches (300 mm) each side of pipe or conduit.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove stones and sharp objects to avoid point loading.

1. For pipes or conduit less than 6 inches (150 mm) in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. For pipes and conduit 6 inches (150 mm) or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
3. Where encountering rock or another unyielding bearing surface, carry trench excavation 6 inches (150 mm) below invert elevation to receive bedding course.

3.8 APPROVAL OF SUBGRADE

A. Notify Architect when excavations have reached required subgrade.

B. When Architect determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

1. Unforeseen additional excavation and replacement material will be paid according to the Contract provisions for changes in Work.

C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Architect.

3.9 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to the Architect.

1. Fill unauthorized excavations under other construction as directed by the Architect.

B. Where indicated widths of utility trenches are exceeded, provide stronger pipe, or special installation procedures, as required by the Architect.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent wind-blown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

A. Backfill excavations promptly, but not before completing the following:

1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for record documents.
3. Testing, inspecting, and approval of underground utilities.
4. Concrete formwork removal.
5. Removal of trash and debris from excavation.
6. Removal of temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.12 UTILITY TRENCH BACKFILL

A. Place and compact bedding course on rock and other unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

B. Concrete backfill trenches that carry below or pass under footings and that are excavated within 18 inches (450 mm) of footings. Place concrete to level of bottom of footings.

C. Provide 4 inch (100 mm) thick concrete base slab support for piping or conduit less than 30 inches (750 mm) below surface of roadways. After installation and testing, completely encase piping or conduit in a minimum of 4 inches (100 mm) of concrete before backfilling or placing roadway subbase.

D. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) over the utility pipe or conduit.

1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.

E. Coordinate backfilling with utilities testing.

F. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed.

G. Place and compact final backfill of satisfactory soil material to final subgrade.

H. Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.13 SUBSURFACE DRAINAGE BACKFILL

A. Subsurface Drain: Place a layer of filter fabric around perimeter of drainage trench or at footing, as indicated. Place a 6 inch (150 mm) compacted course of filtering material on filter fabric to support drainage pipe. After installing and testing, encase drainage pipe in a minimum of 6 inches (150 mm) of compacted filtering material and wrap in filter fabric, overlapping edges at least 6 inches (150 mm).

B. Drainage Backfill: Place and compact drainage backfill of filtering material over subsurface drain, in width indicated, to within 12 inches (300 mm) of final subgrade. Overlay drainage backfill with one layer of filter fabric, overlapping edges at least 6 inches (150 mm).

C. Impervious Fill: Place and compact impervious fill material over drainage backfill to final subgrade.

3.14 FILL

A. Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills.

1. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing surface.

B. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to depth required, pulverize, moisture-condition or aerate soil and recompact to required density.

C. Place fill material in layers to required elevations for each location listed below.

1. Under grass, use satisfactory excavated or borrow soil material.
2. Under walks and pavements, use subbase or base material, or satisfactory excavated or borrow soil material.
3. Under steps and ramps, use subbase material.
4. Under building slabs, use drainage fill material.

3.15 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density.

3.16 COMPACTION

A. Place backfill and fill materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.

C. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, compact the top 12 inches (300 mm) below subgrade and each layer of backfill or fill material at 95 percent maximum dry density.
2. Under walkways, compact the top 6 inches (150 mm) below subgrade and each layer of backfill or fill material at 95 percent maximum dry density.
3. Under lawn or unpaved areas, compact the top 6 inches (150 mm) below subgrade and each layer of backfill or fill material at 90 percent maximum dry density.

3.17 GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between existing adjacent grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 1.2 inches (30 mm).
2. Walks: Plus or minus 1.2 inches (30 mm).
3. Pavements: Plus or minus 1/2 inch (13 mm).

C. Grading Inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10 foot (3 m) straightedge.

3.18 SUBBASE AND BASE COURSES

A. Under pavements and walks, place subbase course material on prepared subgrades. Place base course material over subbases to pavements.

1. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections and thickness to not less than 95 percent of ASTM D 4254 relative density.
2. Shape subbase and base to required crown elevations and cross-slope grades.
3. When thickness of compacted subbase or base course is 6 inches (150 mm) or less, place materials in a single layer.
4. When thickness of compacted subbase or base course exceeds 6 inches (150 mm), place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick when compacted.

B. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders at least 12 inches (300 mm) wide of acceptable soil materials and compact simultaneously with each subbase and base layer.

3.19 DRAINAGE FILL

A. Under slabs-on-grade, place drainage fill course on prepared subgrade.

1. Compact drainage fill to required cross sections and thickness.
2. When compacted thickness of drainage fill is 6 inches (150 mm) or less, place materials in a single layer.
3. When compacted thickness of drainage fill exceeds 6 inches (150 mm) thick place materials in equal layers, with no layer more than 6 inches (150 mm) thick nor less than 3 inches (75 mm) thick when compacted.

3.20 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace material to depth directed by the Architect; reshape and recompact at optimum moisture content to the required density.

C. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION 02300

SECTION 02361

SOIL TREATMENT FOR TERMITE CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Chemical soil treatment.

1.02 REFERENCES

A. Title 7, United States Code, 136 through 136y - Federal Insecticide, Fungicide and Rodenticide Act; United States Code; 1947 (Revised 2001).

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.

C. Manufacturer's Application Instructions: Indicate caution requirements.

D. Manufacturer's Certificate: Certify that toxicants meet or exceed specified requirements.

E. Record moisture content of soil before application.

F. Warranty: Submit warranty and ensure that forms have been completed in Owner's name.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing this type of work and:
   1. Having minimum of 2 years documented experience.
   2. Approved by manufacturer of treatment materials.
   3. Licensed in the State in which the Project is located.

1.05 SEQUENCING

A. Apply toxicant immediately prior to installation of vapor barrier under slabs-on-grade.

B. Prior to each application, applicators must notify the Contractor, construction superintendent or similar responsible party, of the intended application and intended sites of application and instruct the responsible person to notify construction workers and other individuals to leave the area to be treated during application and until the is absorbed into the soil.

1.06 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Provide five year installer's warranty against damage to building caused by termites.
   1. Include coverage for repairs to building and to contents damaged due to building damage. Repair damage and, if required, re-treat.
   2. In addition, provide the Owner an annually renewable termite inspection control contract (to be accepted at the Owner's option), effective five (5) years from date of original soil treatment, to assure necessary re-treatment and liability for terminate damage.

PART 2 PRODUCTS

2.01 MATERIALS

A. Toxicant Chemical: EPA approved; synthetically color dyed to permit visual identification of treated soil.

2.02 MIXES

A. Mix toxicant to manufacturer's instructions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.

3.02 APPLICATION

A. Spray apply toxicant in accordance with manufacturer's instructions.

B. Apply toxicant at following locations:
   1. Horizontal Barriers - Floor Slabs, Etc.: Application shall be made by low-pressure spray (less than 50 psi at the nozzle). Apply the emulsion at the rate of 1 gallon per 10 square feet to fill dirt If fill is washed gravel or other coarse material, apply the emulsion at the rate of 1-1/2 gallons per 10 square feet If concrete slabs cannot be poured over soil the same day it has been treated, a waterproof cover, such as polyethylene sheeting, shall be placed over the soil. This is not required if foundation walls have been installed around the treated soil.
   2. Vertical Barriers - Around the base of foundations, plumbing, back-filled soil against foundation walls, and other critical areas: Applications shall be made by rodding and/or trenching. Apply the emulsion at the rate of 4 gallons per 10 linear feet per foot of depth. For example, a footing 3 feet deep would require 12 gallons of emulsion per 10 linear feet
   3. Outside and inside perimeter applications may be made by rodding and/or trenching. When rodding from grade or from the bottom of a shallow trench, rod holes shall be spaced in a manner that will allow for application of a continuous chemical barrier. Rod holes shall not extend beneath the top of the footings.
   4. Rod from the base of a shallow trench to the top of the footings. Low-pressure spray (less than 50 psi at the nozzle) may be used to treat soil which will be replaced in the trench. Mix the emulsion with the soil as it is being replaced in the trench.
   5. Hollow Masonry Units of the Foundation: Drill and treat voids in multiple masonry elements of the structure extending from the structure to the soil in order to create a continuous treatment barrier in the area to be treated. Apply at the rate of 2 gallons of emulsion per 10 linear feet of footing using a nozzle pressure of less than 25 psi. When using this treatment, access holes must be drilled below the sill plate and shall be as close as possible to the footing as is practical. Treatment of voids in block or rubble foundation walls must be closely examined. Applicators must inspect areas of possible runoff as a precaution against application leakage in the treated areas. Some areas may not be treatable or may require mechanical alteration prior to treatment.

6. When treating foundations deeper than 4 feet. apply the termiticide as the backfill is being replaced, or if the construction contractor fails to notify the applicator to permit this, treat the foundation to a minimum depth of 4 feet after the backfill has been installed. The applicator must trench and rod into the trench or trench along the foundation walls and around pillars and other foundation elements, at the rate prescribed from grade to a minimum depth of 4 feet. When the top of the footing is exposed, the applicator must treat the soil adjacent to the footing to a depth not to exceed the bottom of the footing. However, in no case shall a structure be treated below the footing.

C. If after the soil treatment and prior to the placement of the concrete slabs bearing on the soil, measurable rain, in excess of amount recommended by soils toxicant manufacturer, falls on the treated soil the process shall be repeated as outlined above. The Contractor is advised to consult the local weather bureau prior to application.

D. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.

E. Re-treat disturbed treated soil with same toxicant as original treatment.

F. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

G. Post signs in areas of application warning workers that soil poisoning has been applied. Remove signs when areas are covered by other construction.

3.03 PROTECTION OF FINISHED WORK

A. Do not permit soil grading over treated work.

END OF SECTION

SECTION 02765

PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Parking lot markings, including parking bays, crosswalks, arrows, handicapped symbols, and curb markings.

B. "No Parking" curb painting.

1.02 RELATED SECTIONS

A. Section 02741 - Bituminous Concrete Paving.

B. Section 02751 - Portland Cement Concrete Paving.

C. Section 09310 - DETECTABLE WARNING SURFACE TILE.

D. Section 09610 - DETECTABLE GUIDANCE TILE.

1.03 REFERENCES

A. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; current edition, www.paintinfo.com.

B. FHWA MUTCD - Manual on Uniform Traffic Control Devices for Streets and Highways; U.S. Department of Transportation, Federal Highway Administration; current edition at http://mutcd.fhwa.dot.gov.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. 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.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 PROJECT CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.07 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.

B. Supply 2 containers of each color for Owner's use.

PART 2 PRODUCTS

2.01 MATERIALS

A. Line and Zone Marking Paint: MPI No. 97 Latex Traffic Marking Paint; color(s) as indicated.
   1. Parking Lots: Yellow.
   2. Handicapped Symbols: Blue.

B. Temporary Marking Tape: Preformed, reflective, pressure sensitive adhesive tape in color(s) required; Contractor is responsible for selection of material of sufficient durability as to perform satisfactorily during period for which its use is required.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Clean surfaces thoroughly prior to installation.
   1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.

D. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.

E. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.

F. Temporary Pavement Markings: When required or directed by Architect, apply temporary markings of the color(s), width(s) and length(s) as indicated or directed.
   1. After temporary marking has served its purpose, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that surface to which the marking was applied will not be damaged.
   2. At Contractor's option, temporary marking tape may used in lieu of temporary painted marking; remove unsatisfactory tape and replace with painted markings at no additional cost to Owner.

3.03 INSTALLATION

A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.

B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.

C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.

D. Comply with FHWA MUTCD manual (http://mutcd.fhwa.dot.gov) for details not shown.

E. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.

F. Apply uniformly painted markings of color(s), lengths, and widths as indicated on the drawings true, sharp edges and ends.
   1. Apply paint in one coat only.
   2. Wet Film Thickness: 0.015 inch, minimum.
   3. Length Tolerance: Plus or minus 3 (.
   4. Width Tolerance: Plus or minus 1/8 inch.

G. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.
   1. Mark the International Handicapped Symbol at indicated parking spaces.
   2. Hand application by pneumatic spray is acceptable.

H. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

3.04 DRYING, PROTECTION, AND REPLACEMENT

A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.

B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.

C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.

D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.

E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved method.

F. Replace removed markings at no additional cost to Owner.

END OF SECTION

SECTION 02843

PARKING BUMPERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Precast concrete parking bumpers and anchorage.

1.02 REFERENCES

A. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2007.

B. ASTM C 33 - Standard Specification for Concrete Aggregates; 2003.

C. ASTM C 150 - Standard Specification for Portland Cement; 2005.

D. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete; 2006.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 MATERIALS

A. Parking Bumpers: Precast concrete, conforming to the following:
   1. Profile: Manufacturer's standard.
   2. Cement: ASTM C 150, Portland Type I - Normal; white color.
   3. Concrete Materials: ASTM C 33 aggregate, water, and sand.
   4. Reinforcing Steel: ASTM A 615/A 615M, deformed steel bars; unfinished finish, strength and size commensurate with precast unit design.
   5. Air Entrainment Admixture: ASTM C 260.
   6. Concrete Mix: Minimum 5000 psi, 28 day strength, air entrained to 5 to 7 percent.
   7. Use rigid molds, constructed to maintain precast units uniform in shape, size and finish. Maintain consistent quality during manufacture.
   8. Embed reinforcing steel, and drill or sleeve for two dowels.
   9. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.
   10. Minor patching in plant is acceptable, providing appearance of units is not impaired.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install units without damage to shape or finish. Replace or repair damaged units.

B. Install units in alignment with adjacent work.

C. Fasten units in place with 2 dowels per unit.

END OF SECTION

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes.

B. Related Sections include the following:

1. Division 2 Section "Earthwork" for drainage fill under slabs-on-grade.
2. Division 2 Section "Cement Concrete Pavement" for concrete pavement and walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

1.4 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork. Design and engineering of formwork are Contractor's responsibility.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.

E. Welding Certificates: Copies of certificates for welding procedures and personnel.

F. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Cementitious materials and aggregates.

2. Form materials and form-release agents.
3. Steel reinforcement and reinforcement accessories.
4. Admixtures.
5. Waterstops.
6. Curing materials.
7. Floor and slab treatments.
8. Bonding agents.
9. Adhesives.
10. Vapor retarders.
11. Epoxy joint filler.
12. Joint-filler strips.
13. Repair materials.

G. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

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

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.

C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

F. ACI Publications: Comply with the following, unless more stringent provisions are indicated:

1. ACI 301, "Specification for Structural Concrete."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1. Before submitting design mixes, review concrete mix design and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixes.

c. Ready-mix concrete producer.
d. Concrete subcontractor.
e. Concrete admixture supplier.
f. Structural Engineer.
g. Architect.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. High-density overlay, Class 1, or better.
b. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.
c. Structural 1, B-B, or better, mill oiled and edge sealed.
d. B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of the exposed concrete surface.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.

B. Joint Dowel Bars: Plain-steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III.

1. Fly Ash: ASTM C 618, Class C or F.

B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:

1. Nominal Maximum Aggregate Size: 3/4 inch.
2. Combined Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 sieve, and less than 8 percent may be retained on sieves finer than No. 50.

C. Water: Potable and complying with ASTM C 94.

2.5 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air-Entraining Admixture: ASTM C 260.

C. Water-Reducing Admixture: ASTM C 494, Type A.

D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.6 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Profile: Ribbed with center bulb.

B. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Profile: Ribbed with center bulb.

C. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophylic material for adhesive bonding to concrete.

2.7 VAPOR RETARDERS

A. Vapor Retarder: ASTM E 1745, Class C, of one of the following materials; or polyethylene sheet, ASTM D 4397, not less than 10 mils thick:

2.8 FLOOR AND SLAB TREATMENTS

A. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

B. Unpigmented Mineral Dry-Shake Floor Hardener: Factory-packaged dry combination of portland cement, graded quartz aggregate, and plasticizing admixture.

C. Penetrating Liquid Floor Treatment: Chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.

2.9 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Solvent-Borne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

G. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 22 percent solids.

H. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

I. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.10 RELATED MATERIALS

A. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D 2240.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

C. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

D. Reglets: Fabricate reglets of not less than 0.0217-inch- thick galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

E. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.11 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5700 psi at 28 days when tested according to ASTM C 109.

2.12 CONCRETE MIXES

A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as indicated on drawings.

1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
2. Proportion lightweight structural concrete according to ACI 211.2 and ACI 301.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.

C. Cementitious Materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements.

D. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.

E. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

F. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use high range water-reducing admixture as indicated.

2.13 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.14 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class B, 1/4 inch.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.

1. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Do not chamfer corners or edges of concrete.

J. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

K. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

L. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

M. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor bolts, accurately located, to elevations required.
2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.

B. Leave formwork, for beam soffits, joists, slabs, and other structural elements, that supports weight of concrete in place until concrete has achieved the following:

1. At least 70 percent of 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

C. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

D. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

A. Comply with ACI 318, ACI 301, and recommendations in ACI 347R for design, installation, and removal of shoring and reshoring.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR RETARDERS

A. Vapor Retarder: Place, protect, and repair vapor-retarder sheets according to ASTM E 1643 and manufacturer's written instructions.

3.6 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Shop- or field-weld reinforcement according to AWS D1.4, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.7 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.

1. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.8 WATERSTOPS

A. Flexible Waterstops: Install in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's written instructions.

B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, bonding or mechanically fastening and firmly pressing into place. Install in longest lengths practicable.

3.9 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Architect.

C. Before placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mix.

D. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.

E. Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.

1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

G. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

H. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.10 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch in height.

1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
2. Do not apply rubbed finish to smooth-formed finish.

C. Rubbed Finish: Apply the following to smooth-formed finished concrete:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.11 FINISHING FLOORS AND SLABS

A. General: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes.

1. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system

2. Finish and measure surface so gap at any point between concrete surface and an unleveled free-standing 10-foot- long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed the following:

a. 3/16 inch.
b. 1/8 inch.

E. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.12 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.13 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.14 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than seven days old.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.15 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid epoxy joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.16 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.17 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mix placed each day.
3. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
5. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.

6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
7. Compression Test Specimens: ASTM C 31; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C 39; test one laboratory-cured specimens at 7 days and two at 28 days.

C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

E. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

END OF SECTION 03300

SECTION 03455

GLASS-FIBER-REINFORCED CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Architectural precast glass-fiber-reinforced concrete cornices.

B. Supports, anchors, and attachments.

1.02 RELATED SECTIONS

A. Section 04810 - Unit Masonry Assemblies: Placement of anchors specified in this section.

B. Section 05120 - Structural Steel: Placement of anchors specified in this section.

C. Section 05400 - Cold Formed Metal Framing: Structural stud members.

D. Section 06100 - Rough Carpentry: Placement of anchors specified in this section.

E. Section 07620 - Sheet Metal Flashing and Trim: Reglets recessed in units.

F. Section 07900 - Joint Sealers: Application of backer rods or bond breakers and joint sealers.

1.03 REFERENCES

A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2005

B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.

C. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2006.

D. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2003a.

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; 2006a.

F. ASTM C 33 - Standard Specification for Concrete Aggregates; 2003.

G. ASTM C 150 - Standard Specification for Portland Cement; 2005.

H. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete; 2006.

I. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete; 2005a.

J. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2005.

K. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete; 2005.

L. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2007.

M. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2006.

N. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products; Precast/Prestressed Concrete Institute; 2005.

O. PCI MNL-128 - Recommended Practice for Glass Fiber Reinforced Concrete Panels; Precast/Prestressed Concrete Institute; 2001, Fourth Edition.

1.04 PERFORMANCE REQUIREMENTS

A. Units: Design to withstand dead loads, positive and negative wind loads, and erection forces. Limit deflection of units to accommodate adjacent construction and opening tolerances.

B. Component Connections: Design to accommodate building movement without damage to components, wracking of joint connections, breakage of seals or moisture penetration.

C. Provide adjustment to accommodate misalignment of structure without permanent distortion.

D. Units: To conform to regulatory requirements for life and fire safety.

E. Surface Burning Characteristics: Flame spread/Smoke developed index of 5/15 in accordance with ASTM E 84.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate locations, fabrication details, reinforcement, metal framing details, connection details, dimensions, and relationship to adjacent materials. Provide erection drawings.

C. Samples: Submit two samples 12 inch by 12 inch in size illustrating surface color, finish and texture.

D. Manufacturer's Installation Instructions: Indicate surface cleaning instructions.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with PCI MNL-128.

B. Welding: Comply with AWS D1.1.

C. Fabricator Qualifications: Certified by the Precast/Prestressed Concrete Institute Plant Certification Program; product group A2.

D. Erector Qualifications: Company specializing in performing the work of this section with minimum 5 years of documented experience.

E. Maintain plant records and quality control program during production of units. Make records and access to plant available to Architect upon request.

F. Design wall units under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

1.07 MOCK-UP

A. Construct one panel, 10 feet long by 4 feet wide, with surface finish applied, including supporting backup structure, attachments, fire, air and vapor seals applied.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.08 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.09 PROJECT CONDITIONS

A. Coordinate the Work with installation of backup supporting structure, application of joint sealers.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Handle units to position, consistent with their shape and design. Lift and support only from support points.

B. Lifting Device: Capable of maintaining unit shape 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. Place spacers in same location during transport and site storage.

D. Protect edges of units to prevent staining, chipping, or spalling of concrete.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Glass-Fiber-Reinforced Concrete:
   1. Plastrglas, Inc: www.plastrglas.com.
   2. Stromberg Architectural Products, Inc: www.strombergarchitectural.com.
   3. Substitutions: See Section 01600 - Product Requirements.

2.02 CONCRETE MATERIALS

A. Cement: ASTM C 150, Portland Type I - Normal; white color.

B. Concrete Aggregates: ASTM C 33.

C. Reinforcement: Alkali resistant chopped glass fiber rovings specifically formulated for use in concrete, with lengths varying from 1-1/2 to 2 inches.

D. Admixtures: Conforming to ASTM C 260, ASTM C 494/C 494M, and ASTM C 618.

2.03 FRAMING MATERIALS

A. Metal Framing Members: Formed from hot-dipped galvanized steel sheet, ASTM A 653/A 653M, SS Grade 50 (340) Class 1, with G90/Z275 coating.

2.04 SURFACE FINISH MATERIALS

A. Surface Finish Aggregate: Conforming to sample available for inspection at office of Architect.

2.05 SUPPORT DEVICES

A. Connecting and Support Devices: ASTM A 36/A 36M steel; hot-dip galvanized in accordance with ASTM A 153/A 153M.

B. Primer: Zinc rich oil alkyd.

2.06 MIX

A. Concrete Mix: Of strength to accommodate panel configuration, panel size and weight, and manufacturing criteria, air entrained.

2.07 FABRICATION

A. Use rigid molds, constructed to maintain unit panel uniform in shape, size and finish.

B. Spray-up concrete mix in multiple passes; maintain consistent quality during manufacture.

C. Place metal framing members in position in mold.

D. Embed anchors, inserts, plates, angles, and other cast-in items as indicated on shop drawings.

E. Fabricate connecting devices, items fit to framing members, fasteners and accessories necessary for proper installation.

F. Locate hoisting devices to permit device removal after erection.

G. Cure units to minimize appearance blemishes such as non-uniformity, staining or surface cracking.

H. Identify each unit with corresponding code on erection drawings, in location not visible in finish work.

2.08 FINISH - PANEL UNITS

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

2.09 FINISH - SUPPORT DEVICES AND METAL FRAMING

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

B. Prime paint in one coat, except surfaces in direct contact with concrete or requiring field welding.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

3.03 ERECTION

A. Erect units without damage to shape or finish. Replace or repair damaged panels.

B. Erect units level and plumb within allowable tolerances.

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

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

E. Site cutting of panels not permitted.

F. Fasten units in place with mechanical connections.

G. Touch-up field welds and scratched or damaged primed painted surfaces.

3.04 TOLERANCES

A. Maximum Variation from Plane of Location: 1/4 inch in 10 feet and 3/8 inch in 100 feet, non-cumulative.

B. Maximum Offset from True Alignment Between Two Connecting Units: 1/4 inch.

C. Maximum Out of Square: 1/8 inch in 10 feet, non-cumulative.

D. Variation From Dimensions Indicated on Shop Drawings: Plus or minus 1/8 inch.

E. Maximum Misalignment of Anchors, Inserts, Openings: 1/8 inch.

F. Bowing of Units: Length of Unit/ 360.

G. Exposed Joint Dimension: 1/2 inch plus or minus 1/4 inch.

3.05 FIELD QUALITY CONTROL

A. Perform water absorption test in accordance with PCI MNL-117.

3.06 PROTECTION

A. Protect units from damage.

B. Provide non-combustible shields during welding operations.

END OF SECTION

SECTION 04065

MORTAR AND MASONRY GROUT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mortar for masonry.

B. Grout for masonry.

1.02 RELATED SECTIONS

A. Section 04810 - Unit Masonry Assemblies: Installation of mortar and grout.

B. Section 04816 - Masonry Veneer: Installation of mortar.

C. Section 08115 - Steel Door Frames: Grouting steel door frames installed in masonry.

1.03 REFERENCES

A. ACI 530/ASCE 5/TMS 402 - Building Code Requirements For Masonry Structures; American Concrete Institute International; 2005.

B. ACI 530.1/ASCE 6/TMS 602 - Specification for Masonry Structures; American Concrete Institute International; 2005.

C. ASTM C 5 - Standard Specification for Quicklime for Structural Purposes; 2003.

D. ASTM C 91 - Standard Specification for Masonry Cement; 2005.

E. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2007.

F. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar; 2004.

G. ASTM C 150 - Standard Specification for Portland Cement; 2005.

H. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006.

I. ASTM C 270 - Standard Specification for Mortar for Unit Masonry; 2007.

J. ASTM C 387/C 387M - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete; 2006a.

K. ASTM C 404 - Standard Specification for Aggregates for Masonry Grout; 2006.

L. ASTM C 476 - Standard Specification for Grout for Masonry; 2002.

M. ASTM C 595 - Standard Specification for Blended Hydraulic Cements; 2005.

N. ASTM C 780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2006a.

O. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete; 2005.

P. ASTM C 1019 - Standard Test Method for Sampling and Testing Grout; 2005.

Q. ASTM C 1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2006.

R. ASTM C 1142 - Standard Specification for Extended Life Mortar for Unit Masonry; 1995 (Reapproved 2001).

S. ASTM C 1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2003b.

T. ASTM E 518 - Standard Test Methods for Flexural Bond Strength of Masonry; 2003.

U. IMIAWC (CW) - Recommended Practices & Guide Specifications for Cold Weather Masonry Construction; International Masonry Industry All-Weather Council; 1993.

V. IMIAWC (HW) - Recommended Practices & Guide Specifications for Hot Weather Masonry Construction; International Masonry Industry All-Weather Council; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C 270 is to be used.

C. Samples: Submit two samples of mortar, illustrating mortar color and color range.

D. Reports: Submit reports on mortar indicating conformance of mortar to property requirements of ASTM C 270 and test and evaluation reports per ASTM C 780.

E. Reports: Submit reports on grout indicating conformance of component grout materials to requirements of ASTM C 476 and test and evaluation reports to requirements of ASTM C 1019.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Manufacturer's Instructions: Submit packaged dry mortar manufacturer's installation instructions.

1.05 QUALITY ASSURANCE

A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.
   1. Maintain one copy of each document on project site.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Cold and Hot Weather Requirements: Comply with requirements of ACI 530.1/ASCE 6/TMS 602 or applicable building code, whichever is more stringent.

B. Hot Weather Requirements: Comply with IMIAWC (HW).

PART 2 PRODUCTS

2.01 MATERIALS

A. Masonry Cement: ASTM C 91, Type N.
   1. Colored mortar: Premixed cement as required to match Architect's color sample.
   2. Substitutions: See Section 01600 - Product Requirements.

B. Portland Cement: ASTM C 150, Type I - Normal; color as required to produce approved color sample.

C. Packaged Dry Mortar: ASTM C 387, Type S or M, using gray or white color cement, as required by project conditions.

D. Hydrated Lime: ASTM C 207, Type S.

E. Quicklime: ASTM C 5, non-hydraulic type.

F. Mortar Aggregate: ASTM C 144.

G. Grout Aggregate: ASTM C 404.

H. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C 979.

I. Water: Clean and potable.

J. Accelerating Admixture: Nonchloride type for use in cold weather.

K. Moisture-Resistant Admixture: Water repellent compound designed to reduce capillarity.

L. Bonding Agent: Latex type.

2.02 MORTAR MIXES

A. Ready Mixed Mortar: ASTM C 1142, Type RM.

B. Mortar for Unit Masonry: ASTM C 270, Property Specification.
   1. Engineered masonry: Type M.
   2. Masonry below grade and in contact with earth: Type S.
   3. Exterior, loadbearing masonry: Type M.
   4. Exterior, non-loadbearing masonry: Type N.
   5. Interior, loadbearing masonry: Type M.
   6. Interior, non-loadbearing masonry: Type O.
   7. Pointing mortar: Type N with maximum 2 percent ammonium stearate or calcium stearate per cement weight.

C. Stain Resistant Pointing Mortar: One part Portland cement, 1/8 part hydrated lime, and two parts graded (80 mesh) aggregate, proportioned by volume. Add aluminum tristearate, calcium stearate, or ammonium stearate equal to 2 percent of Portland cement by weight.

D. Pointing Mortar For Glass Unit Masonry: ASTM C 270, Type M, using the Proportion Specification.
   1. Maximum 2 percent ammonium stearate or calcium stearate per cement weight.
   2. Beach sand aggregate.

E. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

2.03 MORTAR MIXING

A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C 270 and in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Add mortar color in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.

D. Do not use anti-freeze compounds to lower the freezing point of mortar.

E. If water is lost by evaporation, re-temper only within two hours of mixing.

2.04 GROUT MIXES

A. Bond Beams and Lintels: 3,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C 94/C 94M.

B. Engineered Masonry: 3,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C 94/C 94M.

2.05 GROUT MIXING

A. Mix grout in accordance with ASTM C 94/C 94M.

B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C 476 for fine and coarse grout.

C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

D. Do not use anti-freeze compounds to lower the freezing point of grout.

2.06 PRECONSTRUCTION TESTING

A. Testing will be conducted by an independent test agency, in accordance with provisions of Section 01400.

B. Mortar Mixes: Test mortars prebatched by weight in accordance with ASTM C 780 recommendations for preconstruction testing.
   1. Test results will be used to establish optimum mortar proportions and establish quality control values for construction testing.

C. Grout Mixes: Test grout batches in accordance with ASTM C 1019 procedures.
   1. Test results will be used to establish optimum grout proportions and establish quality control values for construction testing.

PART 3 EXECUTION

3.01 PREPARATION

A. Apply bonding agent to existing concrete surfaces.

B. Plug clean-out holes for grouted masonry with brick masonry units. Brace masonry to resist wet grout pressure.

3.02 INSTALLATION

A. Install mortar and grout to requirements of section(s) in which masonry is specified.

B. Work grout into masonry cores and cavities to eliminate voids.

C. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.

D. Do not displace reinforcement while placing grout.

E. Remove excess mortar from grout spaces.

3.03 GROUTING

A. Use either high-lift or low-lift grouting techniques, at Contractor's option, subject to other limitations of contract documents.

B. Perform all grouting by means of low-lift technique. Do not employ high-lift grouting.

C. Perform grouting by means of high-lift technique, except in locations that mandate use of low-lift grouting technique.

D. Low-Lift Grouting:
   1. Limit height of pours to 12 inches.
   2. Limit height of masonry to 16 inches above each pour.
   3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
   4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.

E. High-Lift Grouting:
   1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
   2. Brick: Limit pours to maximum 12 feet in height and 25 feet horizontally.
   3. Hollow Masonry: Limit lifts to maximum 4 feet and pours to maximum height of 24 feet.
   4. Place grout for spanning elements in single, continuous pour.

3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field tests, in accordance with provisions of Section 01400.

B. Test and evaluate mortar in accordance with ASTM C 780 procedures.

C. Test and evaluate grout in accordance with ASTM C 1019 procedures.

D. Prism Tests: Test masonry and mortar panels for compressive strength in accordance with ASTM C 1314, and for flexural bond strength in accordance with ASTM C 1072 or ASTM E 518; perform tests and evaluate results as specified in individual masonry sections.

END OF SECTION

SECTION 04230

CALCIUM SILICATE MASONRY UNITS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Calcium silicate masonry units.

B. Mortar for unit masonry.

C. Reinforcement, anchorages, and accessories.

1.02 RELATED SECTIONS

A. Section 04065 - Mortar and Masonry Grout: Mortar for unit masonry.

B. Section 04810 - UNIT MASONRY:.

C. Section 05500 - Metal Fabrications: Loose steel lintels.

D. Section 05400 - Cold Formed Metal Framing: Structural substrate.

E. Section 05120 - Structural Steel: Fabricated steel items.

F. Section 07212 - BOARD AND BATT INSULATION: Insulation for cavity spaces.

G. Section 07620 - Sheet Metal Flashing and Trim: Reglets for flashing.

H. Section 07900 - Joint Sealers: Rod and sealant at control and expansion joints.

1.03 REFERENCES

A. ACI 530/ASCE 5/TMS 402-99: Building Code Requirements for Masonry Structures.

B. ACI 530.1/ASCE 6/TMS 602-99: Specifications for Masonry Structures.

C. ASTM A153/A153M-98: Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.

D. ASTM A580/A580M-98: Standard Specification for Stainless Steel Wire.

E. ASTM C73-97a: Standard Specification for Calcium Silicate Face Brick.

F. ASTM C144-99: Standard Specification for Aggregate for Masonry Mortar.

G. ASTM C150-98: Standard Specification for Portland Cement.

H. ASTM C207-91(1997): Standard Specification for Hydrated Lime for Masonry Purposes.

I. ASTM C270-99: Standard Specification for Mortar for Unit Masonry.

J. CAN/CSA-A5-93: Portland Cement.

K. CSA A82.3-M1978 (Reaffirmed 1992): Calcium Silicate (Sand-Lime) Brick.

L. CSA A179-94: Mortar and Grout for Unit Masonry.

M. CSA A370-94: Connectors for Masonry.

N. CSA A371-94: Masonry Construction for Buildings.

O. International Masonry Institute All-Weather Council: Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

P. Masonry Advisory Council: Hot and Cold Weather Construction.

1.04 QUALITY ASSURANCE

A. Installer: Company or person specializing in commercial masonry work with 5 years documented experience approved by the materials manufacturer.

B. Installation of Masonry Work: to ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602.

1.05 TESTS

A. Submit analysis and testing of unit masonry to requirements of Section 01400.

B. Test samples in accordance with indicated standards.

1.06 SAMPLES

A. Submit samples to requirements of Section 01400.

B. Submit three samples of calcium silicate masonry units to illustrate color and texture.

1.07 MOCKUPS

A. Construct mockup of masonry to requirements of Section 04810.

B. Mockup may [not] remain part of the finished Work.

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver masonry units to the site in approved protective film. Prevent damage to units.

B. Lift skids with proper and sufficiently long slings or forks with protection to prevent damage to units. Protect edges and corners.

C. Store masonry units in a manner designed to prevent damage and staining of units.

D. Stack units on timbers or platforms at least 3" above grade.

E. Place polyethylene or other plastic film between wood and other finished surfaces of units when stored for extended periods of time.

F. Cover stored units with protective enclosure if exposed to weather.

G. Do not use salt or calcium-chloride to remove ice from masonry surfaces.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Cold and Hot Weather Requirements: Comply with requirements of ACI 530.1/ASCE 6/TMS 602 or applicable building code, whichever is more stringent.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers of calcium silicate masonry units having Products considered acceptable for use:
   1. Arriscraft International Inc.

B. Substitutions: See Section 01600 - Product Requirements.

2.02 MANUFACTURED UNITS

A. Calcium Silicate Masonry Units: to ASTM C73, Grade SW; solid units having been pressure formed and autoclaved;3-5/8" bed depth; modular sizes as indicated on drawings; finish as scheduled on exposed faces and ends; special shapes as indicated; color as scheduled, and having the following typical average properties when tested to the identified standard:
   1. Compressive Strength: 6600 psi, to ASTM C170.
   2. Absorption: 8.8 percent, to ASTM C97.
   3. Density: 129 lbs/ft3, to ASTM C97.
   4. Modulus of Rupture: 770 psi, to ASTM C99.

2.03 REINFORCEMENT AND ANCHORAGES

A. See Section 04810 -Unit Masonry.

2.04 MASONRY FLASHING

A. See Section 04810 - Masonry Veneer for requirements.

2.05 ACCESSORIES

A. See Section 04810 - Masonry Veneer for requirements.

2.06 FABRICATION TOLERANCES

A. Fabricate calcium silicate masonry units to the following tolerances:
   1. Unit Length: plus or minus 1/16".
   2. Unit Height: plus or minus 1/16".
   3. Deviation From Square: plus or minus 1/16", with measurement taken using the longest edge as the base.
   4. Bed Depth: plus or minus 1/8".
   5. Custom Dimensions: plus or minus 1/8".
   6. Unit Face Deviations: plus or minus 3/8”.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that site conditions are ready to receive work.

B. Beginning of installation means acceptance of site conditions.

3.02 PREPARATION

A. Supply metal anchors for placement. Direct correct placement.

B. Verify items provided by other sections of work are properly sized and located.

3.03 CUTTING OF MASONRY UNITS

A. Cut masonry units with wet-saw.

B. Pre-soak units using clean water prior to cutting.

C. Clean cut units using a stiff fibre brush and clean water. Allow units to surface dry prior to placement.

3.04 COURSING

A. Place masonry to lines and levels indicated.

B. Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.

C. Lay masonry units in bond as indicated on the drawings.

D. Course one masonry unit and one mortar joint to equal 8".

E. Maintain mortar joint thickness of 3/8".

F. Tool joints to a concave finish.

3.05 PLACING AND BONDING

A. Lay masonry in full bed of mortar, properly jointed with other work. Buttering corners of joints and deep or excessive furrowing of mortar joints are not permitted.

B. Fully bond intersections, and external corners.

C. Isolate masonry partitions from vertical structural framing members with a control joint [as indicated].

D. Do not adjust masonry units after laying. Where resetting of masonry is required, remove, clean units and reset in new mortar.

3.06 CAVITY WALL

A. Install weep vents in veneer at 24” OC horizontally above through-wall flashing above shelf angles and at bottom of walls.

B. Install cavity vents at top of cavity space at same spacing.

3.07 TOLERANCES

A. Variation in Alignment from Unit to Adjacent Unit: 1/16" maximum.

B. Variation of Mortar Joint Thickness: 1/8" every 36".

3.08 REINFORCEMENT AND ANCHORAGES

A. See Section 04810 -Unit Masonry for requirements.

3.09 MASONRY FLASHING

A. See Section 04810 - Masonry Veneer for requirements.

3.10 LINTELS

A. Install lintels as scheduled.

3.11 MOVEMENT CONTROL JOINTS

A. Construct movement joints in locations noted on drawings.

B. Do not continue horizontal joint reinforcing across movement control joints.

C. Form movement control joints by leaving head joints between stacked units void of mortar, ready for application of bond breaker and joint sealant.

D. Size joint in accordance with Section 07900 for sealant performance.

3.12 CLEANING

A. See Section 04810 - Masonry Veneer for requirements.

B. Use alternative cleaning solutions and methods for difficult to clean masonry only after consultation with masonry unit manufacturer.

3.13 PROTECTION

A. Protect masonry units from damage resulting from subsequent construction operations.

B. Use protection materials and methods which will not stain or damage masonry units.

C. Remove protection materials upon Substantial Performance of the Work, or when risk of damage is no longer present.

END OF SECTION

SECTION 04810

UNIT MASONRY ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete Block.

B. Clay Facing Brick.

C. Reinforcement and Anchorage.

D. Flashings.

E. Lintels.

F. Accessories.

1.02 RELATED SECTIONS

A. Section 04065 - Mortar and Masonry Grout.

B. Section 05500 - Metal Fabrications: Loose steel lintels.

C. Section 07900 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.03 REFERENCES

A. ACI 530/ASCE 5/TMS 402 - Building Code Requirements for Masonry Structures; American Concrete Institute International; 2005.

B. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International; 2005.

C. ASTM A 82/A 82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2005a.

D. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.

E. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.

F. ASTM C 90 - Standard Specification for Loadbearing Concrete Masonry Units; 2006b.

G. ASTM C 129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2006.

H. ASTM C 140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2006.

I. ASTM C 216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2007.

J. ASTM C 780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2006a.

K. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2006.

L. ASTM D 4637 - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2004.

M. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, and mortar.

C. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.

D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.

B. Fire Rated Assemblies: Conform to applicable code for UL Assembly No. indicated on the drawings.

1.06 MOCK-UP

A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high, which includes mortar and accessories, wall openings, and flashings.

B. Locate where directed.

C. Mock-up may not remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
   2. Load-Bearing Units: ASTM C 90, normal or light weight.
      a. Hollow block.
   3. Non-Loadbearing Units: ASTM C 129.
      a. Hollow block.
      b. Lightweight.

2.02 BRICK UNITS

A. Manufacturers:
   1. Boral Bricks, Inc: www.boralbricks.com.
   2. Endicott Clay Products Co: www.endicott.com.
   3. General Shale Brick: www.generalshale.com.
   4. Substitutions: See section 01600 - Product requirements.

B. Facing Brick: ASTM C 216, Type FBS, Grade SW.
   1. Color and texture to match Architect's sample.
   2. Nominal size: As indicated on drawings.
   3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

2.03 REINFORCEMENT AND ANCHORAGE

A. Manufacturers of Joint Reinforcement and Anchors:
   1. Dur-O-Wal: www.dur-o-wal.com.
   2. Hohmann & Barnard, Inc: www.h-b.com.
   3. Masonry Reinforcing Corporation of America: www.wirebond.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Single Wythe Joint Reinforcement: Truss type; ASTM A 82/A 82M steel wire, hot dip galvanized after fabrication to ASTM A 153/A 153M, Class B; 0.1875 inch side rods at vertical reinforced masonry with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

C. Multiple Wythe Joint Reinforcement: Truss type; fabricated with moisture drip; ASTM A 82/A 82M steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

D. Strap Anchors: Bent steel shapes configured as required for specific situations, 1-1/4 in width, 0.105 in thick, lengths as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face, corrugated for embedment in masonry joint, hot dip galvanized to ASTM A 153/A 153M, Class B.

E. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.
   1. Concrete frame: Dovetail anchors of bent steel strap, nominal 1 inch width x 0.024 in thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
   2. Steel frame: Crimped wire anchors for welding to frame, 0.25 inch thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.

F. Two-Piece Wall Ties: Formed steel wire, 0.1875 inch thick, adjustable, eye and pintle type, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in.

G. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
   1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
   2. Wire ties: Triangular shape, 0.1875 inch thick.
   3. Vertical adjustment: Not less than 3-1/2 inches.
   4. Seismic Feature: Provide lip, hook, or clip on end of wire ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch diameter.

2.04 FLASHINGS

A. EPDM Flashing: ASTM D 4637, Type II, 0.040 inch thick.

B. Stainless Steel: ASTM A 666, Type 304, soft temper; 26 gage (0.45 mm) thick; finish 2B to 2D.

C. Lap Sealant: Butyl type as specified in Section 07900.

2.05 ACCESSORIES

A. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; 3 inch wide x by maximum lengths available.

B. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
   1. Mortar Diverter: Panels designed for installation at flashing locations.
      a. Manufacturers:
         1) Mortar Net USA, Ltd: www.mortarnet.com.
         2) Substitutions: See Section 01600 - Product Requirements.

C. Building Paper: ASTM D 226, Type I ("No.15") asphalt felt.

D. Weeps: Polyester mesh.
   1. Manufacturers:
      a. CavClear/Archovations, Inc.; CavClear Weep Vents: www.cavclear.com.
      b. Mortar Net USA, Ltd: www.mortarnet.com.
      c. Substitutions: See Section 01600 - Product Requirements.

E. Cavity Vents: Polyester mesh.
   1. Manufacturers:
      a. CavClear/Archovations, Inc.; CavClear Weep Vents: www.cavclear.com.
      b. Dur-O-Wal: www.dur-o-wal.com.
      c. Mortar Net USA, Ltd: www.mortarnet.com.
      d. Substitutions: See Section 01600 - Product Requirements.

F. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.06 LINTELS

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches.
   3. Mortar Joints: Concave.

D. Brick Units:
   1. Bond: Running.
   2. Coursing: Three units and three mortar joints to equal 8 inches.
   3. Mortar Joints: Concave.

3.04 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Interlock intersections and external corners, except for units laid in stack bond.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Cut mortar joints flush where wall tile is scheduled, resilient base is scheduled, cavity insulation vapor barrier adhesive is applied, or bitumen dampproofing is applied.

I. Isolate masonry partitions from vertical structural framing members with a control joint.

J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.05 WEEPS/CAVITY VENTS

A. Install weeps in veneer and cavity walls at 24 inches on center horizontally above through-wall flashing, and at bottom of walls.

B. Install cavity vents in veneer and cavity walls at 32 inches on center horizontally below shelf angles and lintels, and near top of walls.

3.06 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

C. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.07 REINFORCEMENT AND ANCHORAGE - GENERAL

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center (8 inches on center for reinforced masnory).

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

E. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

3.08 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Lap joint reinforcement ends minimum 6 inches.

D. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

E. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

F. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.

G. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

3.09 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

A. Install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of openings.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches horizontally and 24 inches vertically.

F. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

3.10 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 4 inches into adjacent masonry or turn up at least 4 inches to form watertight pan at non-masonry construction.
   2. Remove or cover protrusions or sharp edges that could puncture flashings.
   3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Extend metal flashings to within 1/4 inch of exterior face of masonry.

C. Extend plastic and EPDM flashings to within 1/4 inch of exterior face of masonry.

D. Lap end joints of flashings at least 4 inches and seal watertight with mastic or elastic sealant.

3.11 LINTELS

A. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
   1. Openings to 42 inches: Place two, No. 3 reinforcing bars 1 inch from bottom web.
   2. Openings from 42 inches to 78 inches: Place two, No. 5 reinforcing bars 1 inch from bottom web.
   3. Openings over 78 inches: See Structural Drawings.
   4. Do not splice reinforcing bars.
   5. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
   6. Place and consolidate grout fill without displacing reinforcing.
   7. Allow masonry lintels to attain specified strength before removing temporary supports.

B. Maintain minimum 8 inch bearing on each side of opening.

3.12 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control and expansion joints.

B. Form control joint with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.

C. Size control joint in accordance with Section 07900 for sealant performance.

D. Form expansion joint as detailed.

3.13 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout.
   1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

D. Do not build into masonry construction organic materials that are subject to deterioration.

3.14 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch.

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.15 CUTTING AND FITTING

A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape,and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.16 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01400.

B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C 140 for conformance to requirements of this specification.

C. Mortar Tests: Test each type of mortar in accordance with ASTM C 780, testing with same frequency as masonry samples.

3.17 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.18 PROTECTION OF FINISHED WORK

A. Without damaging completed work, provide protective boards at exposed external corners which are subject to damage by construction activities.

END OF SECTION

SECTION 05120 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes structural steel.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 5 Section "Steel Deck" for field installation of shear connectors.
2. Division 5 Section "Metal Fabrications" for loose steel bearing plates and miscellaneous steel framing.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Engineer structural steel connections required by the Contract Documents to be selected or completed by the fabricator to withstand design loadings indicated.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of product specified.

C. Shop Drawings detailing fabrication of structural steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
3. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tension, or tensioned shear/bearing connections.

D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Mill test reports signed by manufacturers certifying that their products, including the following, comply with requirements.

1. Structural steel, including chemical and physical properties.
2. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
3. Direct-tension indicators.

4. Shop primers.
5. Nonshrink grout.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work.

1. Fabricator must participate in the AISC Quality Certification Program and be designated an AISC-Certified Plant as follows:

a. Category: Category I, conventional steel structures.

C. Comply with applicable provisions of the following specifications and documents:

1. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
2. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
3. AISC's "Seismic Provisions for Structural Steel Buildings."
4. ASTM A 6 "Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use."
5. Research Council on Structural Connections' (RCSC) "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel."

1. Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver structural steel to Project site in such quantities and at such times to ensure continuity of installation.

B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
2. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.7 SEQUENCING

A. Supply anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural Steel Shapes, Plates, and Bars: As follows:

1. Carbon Steel: ASTM A 36.

B. Cold-Formed Structural Steel Tubing: ASTM A 500, Grade B.

C. Anchor Rods, Bolts, Nuts, and Washers: As follows:

1. Unheaded Rods: ASTM A 36.
2. Washers: ASTM A 36.

D. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.

1. Finish: Plain, uncoated.
2. Direct-Tension Indicators: ASTM F 959, Type 325.

a. Finish: Plain, uncoated.

E. Welding Electrodes: Comply with AWS requirements.

2.2 PRIMER

A. Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer with good resistance to normal atmospheric corrosion, complying with performance requirements of FS TT-P-664.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, of consistency suitable for application, and a 30-minute working time.

2.4 FABRICATION

A. Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this Section and in Shop Drawings.

1. Camber structural steel members where indicated.
2. Identify high-strength structural steel according to ASTM A 6 and maintain markings until steel has been erected.
3. Mark and match-mark materials for field assembly.

4. Fabricate for delivery a sequence that will expedite erection and minimize field handling of structural steel.
5. Complete structural steel assemblies, including welding of units, before starting shop-priming operations.
6. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded.

C. Finishing: Accurately mill ends of columns and other members transmitting loads in bearing.

D. Holes: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on Shop Drawings.

1. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.
2. Weld threaded nuts to framing and other specialty items as indicated to receive other work.

2.5 SHOP CONNECTIONS

A. Shop install and tighten nonhigh-strength bolts, except where high-strength bolts are indicated.

B. Shop install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1. Bolts: ASTM A 325 high-strength bolts, unless otherwise indicated.
2. Connection Type: Snug tightened, unless indicated as slip-critical, direct-tension, or tensioned shear/bearing connections.

C. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.

2.6 SHOP PRIMING

A. Shop prime steel surfaces, except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.

B. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC's "Painting System Guide No. 7.00" to provide a dry film thickness of not less than 1.5 mils.

2.7 SOURCE QUALITY CONTROL

A. Owner will engage an independent testing and inspecting agency to perform shop inspections and tests and to prepare test reports.

1. Testing agency will conduct and interpret tests and state in each report whether test specimens comply with or deviate from requirements.
2. Provide testing agency with access to places where structural steel Work is being fabricated or produced so required inspection and testing can be accomplished.

B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.

C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

D. Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1. Direct-tension indicator gaps will be verified to comply with ASTM F 959, Table 2.

E. Field welds will be visually inspected according to AWS D1.1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before erection proceeds, and with the steel erector present, verify elevations of concrete and masonry bearing surfaces and locations of anchorages for compliance with requirements.

B. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section.

B. Base and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.

1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
3. Pack grout solidly between bearing surfaces and plates so no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.

a. Comply with manufacturer's instructions for proprietary grout materials.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.

E. Splice members only where indicated.

F. Finish sections thermally cut during erection equal to a sheared appearance.

G. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

A. Install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1. Bolts: ASTM A 325 high-strength bolts, unless otherwise indicated.
2. Connection Type: Snug tightened, unless indicated as slip-critical, direct-tension, or tensioned shear/bearing connections.

B. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.

1. Comply with AISC specifications referenced in this Section for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.

3.5 FIELD QUALITY CONTROL

A. Owner will engage an independent testing and inspecting agency to perform field inspections and tests and to prepare test reports.

1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements.

B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.

C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

D. Field-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1. Direct-tension indicator gaps will be verified to comply with ASTM F 959, Table 2.

E. Field welds will be visually inspected according to AWS D1.1.

3.6 CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.

1. Apply by brush or spray to provide a minimum dry film thickness of 1.5 mils.

END OF SECTION 05120

SECTION 05210 - STEEL JOISTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Open-web K-series steel joists.
2. Joist accessories.

B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for installing bearing plates in concrete.

1.3 DEFINITIONS

A. Special Joists: Joists requiring modification by the manufacturer to support nonuniform, unequal, or special loading conditions that invalidate SJI's "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders."

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide special joists and connections capable of withstanding design loads within limits and under conditions indicated.

B. Design joists to withstand design loads with live load deflections no greater than the following:

1. Roof Joists: Vertical deflection of L/360 of the span.

1.5 SUBMITTALS

A. Product Data: For each type of joist, accessory, and product indicated.

B. Shop Drawings: Show layout, mark, number, type, location, and spacings of joists. Include joining and anchorage details, bracing, bridging, accessories; splice and connection locations and details; and attachments to other construction.

1. Indicate locations and details of anchorage devices and bearing plates to be embedded in other construction.

C. Welding Certificates: Copies of certificates for welding procedures and personnel.

D. Mill certificates signed by manufacturers of bolts certifying that their products comply with specified requirements.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

F. Research/Evaluation Reports: Evidence of steel joists' compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing joists similar to those indicated for this Project and with a record of successful in-service performance.

1. Manufacturer must be certified by SJI to manufacture joists complying with SJI standard specifications and load tables.
2. Assumes responsibility for engineering special joists to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. SJI Specifications: Comply with SJI's "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders" (hereafter, "Specifications"), applicable to types of joists indicated.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel"; and AWS D1.3 "Structural Welding Code--Sheet Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's "Specifications."

B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel: Comply with SJI's "Specifications" for chord and web members.

B. Welding Electrodes: Comply with AWS standards.

2.2 PRIMERS

A. Primer: SSPC-Paint 15, Type I, red oxide; FS TT-P-636, red oxide; or manufacturer's standard shop primer complying with performance requirements of either of these red-oxide primers.

2.3 OPEN-WEB K-SERIES STEEL JOISTS

A. Manufacture steel joists according to "Standard Specifications for Open Web Steel Joists, K-Series," in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord; of joist type indicated.

B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.

C. Provide holes in chord members for connecting and securing other construction to joists.

D. Camber joists according to SJI's "Specifications."

2.4 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span.

B. Steel bearing plates with integral anchorages are specified in Division 5 Section "Metal Fabrications."

C. Supply ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch (13 mm) of finished wall surface, unless otherwise indicated.

D. Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

2.5 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.

B. Apply one shop coat of primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

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

3.2 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.

C. Field weld joists to supporting steel bearing plates. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Bolt joists to supporting steel framework using high-strength structural bolts, unless otherwise indicated. Comply with RCSC's "Allowable Stress Design Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.

E. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Field welds will be visually inspected according to AWS D1.1.

C. Bolted connections will be visually inspected.

D. Correct deficiencies in Work that inspections and test reports have indicated are not in compliance with specified requirements.

E. Additional testing will be performed to determine compliance of corrected Work with specified requirements.

3.4 REPAIRS AND PROTECTION

A. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates and abutting structural steel.

1. Clean and prepare surfaces by hand-tool cleaning, SSPC-SP 2, or power-tool cleaning, SSPC-SP 3.
2. Apply a compatible primer of the same type as the shop primer used on adjacent surfaces.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION 05210

SECTION 05310 - STEEL DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Noncomposite form deck.

B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for concrete fill and reinforcing steel.

2. Division 5 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other construction.

C. Product Certificates: Signed by steel deck manufacturers certifying that products furnished comply with requirements.

D. Welding Certificates: Copies of certificates for welding procedures and personnel.

E. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:

1. Mechanical fasteners.

F. Research/Evaluation Reports: Evidence of steel deck's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

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

B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

D. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 NONCOMPOSITE FORM DECK

A. Noncomposite Steel Form Deck: Fabricate ribbed-steel sheet noncomposite form deck panels to comply with "SDI Specifications and Commentary for Noncomposite Steel Form Deck," in SDI Publication No. 29, the minimum section properties indicated, and the following:

1. Galvanized Steel Sheet: ASTM A 653, Structural Steel (SS), Grade 33, G60 zinc coating.

2. Profile Depth: As indicated.

3. Design Uncoated-Steel Thickness: As indicated.

4. Span Condition: Triple span or more.

5. Side Laps: Overlapped or interlocking seam at Contractor's option.

2.2 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Steel Sheet Accessories: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

H. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.

I. Galvanizing Repair Paint: ASTM A 780.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 29, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.

C. Locate decking bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to decking.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 FLOOR DECK INSTALLATION

A. Fasten floor deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:

1. Weld Diameter: 5/8 inch, nominal.

2. Weld Spacing: Weld edge ribs of panels at each support. Space additional welds an average of 12 inches apart, but not more than 18 inches apart.

3. Weld Washers: Install weld washers at each weld location.

B. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

1. End Joints: Lapped or butted at Contractor's option.

C. Floor Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of decking. Weld cover plates at changes in direction of floor deck panels, unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing agency to perform field quality-control testing.

B. General: The Structural Engineer will name a testing agency to perform tests and to submit test reports. Testing agency will be paid by the general contractor. General contractor is to provide the allowance noted on the drawings in the base bid for testing services.

C. Field welds will be subject to inspection.

D. Testing agency will report test results promptly and in writing to Contractor and Architect.

E. Remove and replace work that does not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05310

SECTION 05313 - STEEL FLOOR DECK

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Steel floor deck and accessories.

B. Formed steel deck end forms to contain wet concrete.

C. Framing for openings up to and including 18 inches.

D. Bearing plates and angles.

E. Shear stud connectors.

1.2 REFERENCES

A. AISI - Specification for the Design of Cold-Formed Steel Structural Members.

B. ASTM A36 - Structural Steel.

C. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.

D. ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

E. ASTM A525 - Steel Sheet, Zinc-Coated, Galvanized by the Hot-Dip Process.

F. ASTM A611 - Steel, Cold-Rolled Sheet, Carbon, Structural.

G. AWS D1.1 - Structural Welding Code.

H. SDI - Design Manual for Composite Decks, Form Decks, Roof Decks.

1.3 PERFORMANCE REQUIREMENTS

A. Design metal decking in accordance with SDI Design Manual for Composite Decks, Form Decks, Roof Decks.

B. Calculate to structural working stress design and maximum vertical deck deflection of 1/240.

C. Lateral deflection of diaphragm shall not exceed 1/500 of the height of the wall.

D. Design deck and shear studs to resist a maximum shear strength of 55000 psi.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate decking plan, support locations, projections, openings and reinforcement. Indicate temporary shoring of decking where required.

C. Product Data: Provide deck profile characteristics and dimensions, structural properties, finishes.

D. Manufacturer's Installation Instructions: Indicate specific installation sequence, special instructions.

1.5 QUALIFICATIONS

A. Installer: Company specializing in performing the work of this Section with minimum 3 years documented experience.

B. Design deck layout, spans, fastening, joints, and under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State where project is located.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Section 01600.

B. Store and protect products under provisions of Section 01600.

C. Cut plastic wrap to encourage ventilation.

D. Separate sheets and store decking on dry wood sleepers; slope for positive drainage.

1.7 FIELD MEASUREMENTS

A. Verify that field measurements are as shown on Drawings.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. VULCRAFT

B. WHEELING

C. CONSOLIDATION

D. Substitutions: Under provisions of Section 01600.

2.2 MATERIALS

A. Sheet Steel: ASTM A446, Grade B Structural Quality; with G60 galvanized coating conforming to ASTM A525.

B. Bearing Plates Angles: ASTM A36 steel.

C. Stud Shear Connectors: ASTM A108 steel, Grade 1015 forged steel, headed, uncoated.

D. Welding Materials: AWS D1.1.

E. Touch-Up Primer: Zinc chromate.

2.3 ACCESSORIES

A. Flute Closures: Closed cell foam rubber profiled to fit tight to the decking.

2.4 FABRICATION

A. Metal Decking: Sheet steel, configured as follows:
Span Design: Multiple, Double, Single
Minimum Metal Thickness (Excluding Finish): 28
Nominal Height: .6 inch profile to WR
Formed Sheet Width: MFG Standard
Side Joints: Lapped
Flute Sides: Plain vertical face.

B. Fasteners: Galvanized hardened steel.

C. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means installer accepts existing conditions.

3.2 INSTALLATION

A. Erect metal decking in accordance with SDI Design Manual for Composite Decks, Form Decks, Roof Decks.

B. Bear decking on masonry support surfaces with 6 inch minimum bearing. Align and level.

C. Bear decking on steel supports with 1-1/2 3 inch minimum bearing. Align and level.

D. Weld in accordance with AWS D1.1.

E. Weld stud shear connectors through steel deck to structural members below as indicated.

F. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up prime paint.

END OF SECTION

SECTION 05500

METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel and aluminum items.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 03400 - Precast Concrete Hollow Core Planks: Placement of metal fabrications in precast concrete.

C. Section 04810 - Unit Masonry Assemblies: Placement of metal fabrications in masonry.

D. Section 05210 - Steel Joist: Structural joist bearing plates, including anchorage.

E. Section 05510 - Metal Stairs.

F. Section 05520 - Handrails and Railings.

G. Section 09900 - Paints and Coatings: Paint finish.

1.03 REFERENCES

A. AA DAF-45 - Designation System for Aluminum Finishes; The Aluminum Association, Inc.; 2003.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 1998.

C. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels; 2002.

D. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2005.

E. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2005.

F. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2002.

G. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2005.

H. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2006a.

I. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.

J. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.

K. ASTM A 283/A 283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2003.

L. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength; 2004.

M. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2006.

N. ASTM A 325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric); 2005.

O. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2003a.

P. ASTM A 501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2001 (Reapproved 2005).

Q. ASTM B 26/B 26M - Standard Specification for Aluminum-Alloy Sand Castings; 2005.

R. ASTM B 85 - Standard Specification for Aluminum-Alloy Die Castings; 2003.

S. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2006.

T. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2006.

U. ASTM B 210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2004.

V. ASTM B 210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes (Metric); 2005.

W. ASTM B 211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire; 2003.

X. ASTM B 211M - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire (Metric); 2003.

Y. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2006.

Z. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2006.

AA. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2007.

AB. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2006.

AC. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).

AD. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

AE. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Design under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A 36/A 36M or ASTM A 572.

B. Steel Tubing: ASTM A 501 hot-formed structural tubing.

C. Plates: ASTM A 283.

D. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.

E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

A. Extruded Aluminum: ASTM B 221 (ASTM B 221M), 6063 alloy, T6 temper.

B. Sheet Aluminum: ASTM B 209 (ASTM B 209M), 5052 alloy, H32 or H22 temper.

C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B 210 (ASTM B 210M), 6063 alloy, T6 temper.

D. Aluminum-Alloy Bars: ASTM B 211 (ASTM B 211M), 6061 alloy, T6 temper.

E. Aluminum-Alloy Sand Castings: ASTM B 26.

F. Aluminum-Alloy Die Castings: ASTM B 85.

G. Bolts, Nuts, and Washers: Steel, galvanized to ASTM A 153/A 153M.

H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
   1. Side Rails: 3/8 x 2 inches members spaced at 20 inches.
   2. Rungs: one inch diameter solid round bar spaced 12 inches on center.
   3. Space rungs 7 inches from wall surface.

B. Bumper Posts and Guard Rails: As detailed; prime paint finish.

C. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; galvanized finish.

D. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of masonry; galvanized finish.

E. Lintels: As detailed; prime paint finish.

F. Door Frames for Overhead Door Openings and Wall Openings: Channel sections; prime paint finish.

G. Elevator Hoistway Divider Beams: Beam sections; prime paint finish.

H. Pool terrace rail/fence and gate out of aluminum bar and plate stock materials.

2.05 FINISHES - STEEL

A. Prime paint all steel items.
   1. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A 123/A 123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements.

2.06 FINISHES - ALUMINUM

A. Superior Performance Organic Coating System: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system; color as selected from manufacturer's standard colors.

B. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.07 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal and aluminum where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on shop drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05510

METAL STAIRS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural steel stair framing and supports.

B. Integral balusters and handrails.

C. Handrails at walls.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete: Concrete fill in stair pans and landings; mesh reinforcement for landings.

B. Section 03300 - Cast-in-Place Concrete: Placement of metal anchors in concrete.

C. Section 04810 - Unit Masonry Assemblies: Placement of metal fabrications in masonry.

D. Section 05500 - Metal Fabrications.

E. Section 05520 - Handrails and Railings: Metal handrails and balusters other than specified in this section.

F. Section 09900 - Paints and Coatings: Paint finish.

1.03 REFERENCES

A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2005.

B. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2006a.

C. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.

D. ASTM A 283/A 283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2003.

E. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2006.

F. ASTM A 325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric); 2005.

G. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2003a.

H. ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2007.

I. ASTM E 985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

J. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2007.

K. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2006.

L. NAAMM AMP 510 - Metal Stairs Manual; The National Association of Architectural Metal Manufacturers; 1992, Fifth Edition.

M. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).

N. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).

1.04 DESIGN REQUIREMENTS

A. Design and fabricate stair assembly to support a uniform live load of 100 lb/sq ft and a concentrated load of 300 lb with deflection of stringer or landing framing not to exceed L/180 of span.

B. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E 985 and applicable local code.

C. Fabricate metal stairs to comply with NAAMM AMP 510, Class Commercial.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Certificates.

1.06 QUALITY ASSURANCE

A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.

PART 2 PRODUCTS

2.01 METAL STAIRS - GENERAL

A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
   1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, State, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
   2. Dimensions: As indicated on drawings.
   3. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
   4. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
   5. Separate dissimilar metals using paint or permanent tape.

B. Metal Jointing and Finish Quality Levels:

C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.02 MATERIALS

A. Steel Sections: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500, Grade B cold-formed structural tubing.

C. Steel Plates: ASTM A 283.

D. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

E. Ungalvanized Steel Sheet: ASTM A 1008/A 1008M, Designation SS, Grade 33, Type 1.

F. Concrete Reinforcement: Mesh type as detailed, galvanized.

G. Steel Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.

H. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; consistent with design of stair structure.

I. Welding Materials: AWS D1.1; type required for materials being welded.

J. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.03 COMPONENTS

A. Metal Pan Stair Treads: Concrete in metal pan; 1-1/2 inches deep; smooth surface; non-slip edge.

B. Concrete for Treads and Landings: Portland cement Type I, 3000 psi 28 day strength, 2 to 3 inch slump.

2.04 FABRICATION - GENERAL

A. Fit and shop assemble components in largest practical sections, for delivery to site.

B. Fabricate components with joints tightly fitted and secured.

C. Continuously seal joined pieces by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

G. Fabricate components accurately for anchorage to each other and to building structure.

2.05 FABRICATION - PAN STAIRS AND LANDINGS

A. Fabricate stairs and landings with closed risers and treads of metal pan construction using ungalvanized steel sheet, ready to receive concrete.

B. Form treads and risers with minimum 14 gage sheet steel stock.

C. Secure reinforced tread pans to stringers with clip angles; welded in place.

D. Form stringers with rolled steel channels, 10 inches deep. Weld fascia plates to channels using 14 gage steel sheet across channel toes.

E. Form landings with minimum 14 gage sheet stock. Reinforce underside with angles to attain design load requirements.

F. Form balusters with 1/4 inch square steel sections, welded to stringers.

G. Prime paint components.

2.06 FINISHING

A. Prepare surfaces to be primed in accordance with SSPC-SP 2.

B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

C. Do not prime surfaces in direct contact with concrete or where field welding is required.

D. Prime paint items with one coat.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. When field welding is required, clean and strip primed steel items to bare metal.

B. Supply items required to be cast into concrete and embedded in masonry with setting templates.

3.03 INSTALLATION

A. Install components plumb and level, accurately fitted, free from distortion or defects.

B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.

C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

D. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1.

E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.

F. Field bolt and weld to match shop bolting and welding. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

G. Mechanically fasten joints butted tight, flush, and hairline. Grind welds smooth and flush.

H. Obtain approval prior to site cutting or creating adjustments not scheduled.

I. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

END OF SECTION

SECTION 05520

HANDRAILS AND RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall mounted handrails.

B. Stair railings and guardrails.

C. Free-standing railings at steps.

D. Balcony railings and guardrails.

E. Terrace rail/fence and gates.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete: Placement of anchors in concrete.

B. Section 04810 - Unit Masonry Assemblies: Placement of anchors in masonry.

C. Section 05510 - Metal Stairs: Handrails for metal stairs.

D. Section 09260 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.

E. Section 09900 - Paints and Coatings: Paint finish.

1.03 REFERENCES

A. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2006a.

B. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.

C. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2003a.

D. ASTM B 211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire; 2003.

E. ASTM B 211M - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire (Metric); 2003.

F. ASTM B 241/B 241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2002.

G. ASTM B 429/B 429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2006.

H. ASTM B 483/B 483M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Tubes and Pipe for General Purpose Applications; 2003.

I. ASTM E 935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

J. ASTM E 985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

K. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); The Society for Protective Coatings; 2002 (Ed. 2004).

1.04 DESIGN REQUIREMENTS

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Handrails and Railings:
   1. Poma Corp: www.pomacorp.com.
   2. Sterling Dula Architectural Products: www.sterlingdula.com.
   3. The Wagner Companies: www.wagnercompanies.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E 985 and applicable local code.

B. Design railing assembly, wall rails, and attachments to resist lateral force of 75 lbs at any point without damage or permanent set. Test in accordance with ASTM E 935.

C. Allow for expansion and contraction of members and building movement without damage to connections or members.

D. Dimensions: See drawings for configurations and heights.

E. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.

F. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.03 ALUMINUM MATERIALS

A. Aluminum Tube: Minimum wall thickness of 0.127 inch; ASTM B 429/B 429M, ASTM B 241/B 241M, or ASTM B 483/B 483M.

B. Solid Bars and Flats: ASTM B 211 (ASTM B 211M).

C. Welding Fittings: No exposed fasteners; machined aluminum.

2.04 STEEL RAILING SYSTEM

A. Steel Tube: ASTM A 500, Grade B cold-formed structural tubing.

B. Steel Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.

D. Fittings: Elbows, T-shapes, wall brackets, escutcheons; cast steel.

E. Mounting: Adjustable Brackets and flanges, with steel inserts for casting in concrete.

F. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.

G. Galvanizing: In accordance with requirements of ASTM A 123/A 123M.
   1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic.

2.05 FABRICATION

A. Accurately form components to suit specific project conditions and for proper connection to building structure.

B. Fit and shop assemble components in largest practical sizes for delivery to site.

C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

D. Welded Joints:

E. Provide anchors and plates required for connecting railings to structure.

F. Exposed Mechanical Fastenings: Provide flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

G. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

H. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.

I. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.

J. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

K. Accurately form components to suit specific project conditions and for proper connection to building structure.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.

C. Apply one coat of bituminous paint to concealed aluminum surfaces that will be in contact with cementitious or dissimilar materials.

3.03 INSTALLATION

A. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.

B. Anchor railings securely to structure.

C. Field weld anchors as indicated on drawings. Touch-up welds with primer. Grind welds smooth.

D. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

E. Assemble with spigots and sleeves to accommodate tight joints and secure installation.

3.04 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preservative treated wood materials.

B. Fire retardant treated wood materials.

C. Miscellaneous framing and sheathing.

D. Concealed wood blocking, nailers, and supports.

E. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED SECTIONS

A. Section 05120 - Structural Steel: Prefabricated beams and columns for support of wood framing.

B. Section 05500 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.

C. Section 06173 - Plate Connected Wood Trusses.

D. Section 07620 - Sheet Metal Flashing and Trim: Sill flashings.

1.03 REFERENCES

A. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2006a

C. ASTM C 1177/C 1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2006.

D. ASTM C 1396/C 1396M - Standard Specification for Gypsum Board; 2006a.

E. ASTM D 2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 1994 (Reapproved 2004).

F. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2007.

G. AWPA C20 - Structural Lumber -- Fire Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 2002.

H. AWPA C27 - Plywood -- Fire-Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 2002.

I. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood-Preservers' Association; 2007.

J. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.

K. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc.; 2002.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide technical data on wood preservative materials and application instructions.

C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
   1. Lumber of other species or grades, or graded by other agencies, is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

B. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.

C. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

1.06 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Southern Pine, unless otherwise indicated.
   2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Provide sustainably harvested wood; see Section 01600 for requirements.

2.02 DIMENSION LUMBER

A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: Kiln-dry or MC15.

D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

E. Miscellaneous Blocking, Furring, and Nailers:
   1. Lumber: S4S, No. 2 or Standard Grade.

2.03 CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: Interior grade, A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E 84.

B. Other Applications:
   1. Electrical Component Mounting: APA rated sheathing, fire retardant treated.

2.04 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
   2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Fire Retardant Treatment:
   1. Manufacturers:
      a. Arch Wood Protection, Inc; Product DRICON® FRT : www.wolmanizedwood.com.
      b. Substitutions: See Section 01600 - Product Requirements.

C. Preservative Treatment:
   1. Manufacturers:
      a. Arch Wood Protection, Inc; Product FrameGuard®: www.wolmanizedwood.com.
      b. Substitutions: See Section 01600 - Product Requirements.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.03 INSTALLATION OF CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.

3.04 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.05 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01732.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06200

FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Includes but isnot limited to the materials and installation of:
   1. Fixed and adjustable shelving including wall standards.
   2. Interior standing and running trim.
   3. Raised panel construction.
   4. Fireplace mantel and millwork.
   5. Maintenance area work bench.
   6. Wardrobe shelf and rod system.
   7. Wood pickets for Trash Enclosure gates.
   8. Other items shown or as may be required to complete the Work.

1.02 RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Steel gate frame to receive wood pickets

B. Section 06100 - Rough Carpentry: Nailers and blocking required for the installation of Finish carpentry items.

C. Section 09250 - Gypsum Wallboard: Coordination of gypsum wallboard construction with the finish carpentry installations.

D. Section 09900 - Painting: Finishing of finish carpentry items.

1.03 QUALITY ASSURANCE

A. Woodworking Standards:
   1. Design and Construction Features: Comply with details and profiles shown. Where not otherwise shown, comply with applicable AWI Quality Standards, with alternate details at fabricator's option.
   2. All shelving shall be manufactured to meet the quality standards of the Architectural Woodwork Institute, AWI Section 600, Premium Grade.
   3. All wood trim, moldings and raised panel work shall be manufactured and installed to meet the quality standards of the Architectural Woodwork Institute, AWL Section 30(1. Premium Grade.
      a. Comply with details shown for profile and construction wood trim and millwork items. Where not otherwise shown, comply with applicable AWI Quality Standards, with alternate details at fabricators option.
   4. Installation of Interior Millwork Items: Comply with requirements of the Architectural Woodwork Institute, Awl Section 1700.

B. Grading Standards:
   1. Moisture Content: The maximum moisture content of treated or untreated finish lumber, trim and millwork is not to exceed 10% at the time of delivery.
   2. Grading Standards: Softwood framing lumber shall comply with Product Standard 20 and with the specific grading association standards and specifications listed below:
   3. Southern Pine: Standard Grading Rules for Southern Pine Lumber, published by Southern Pine Inspection Bureau and trademarked SPIB.
   4. All plywood shall be manufactured in accordance with U.S. Product Standard PS-I0 and grademarked.
   5. All board lumber shall comply with PS 20 and grademarked by either of the associations listed in paragraph above.

6. Hardwood lumber shall comply with national Hardwood Lumber Association rules.

C. Wood specified herein for the wood gates shall be in accordance with the following agencies:
   1. West Coast Lumber inspection Bureau (WCLIB Grading Rules).
   2. Western Wood products Association (WWPA Grading Rules).

1.04 SUBMITTALS

A. Submit shop drawings for the following:
   1. Shelving: Show shelving layouts, shelf spacing and standards anchorage as well as types of anchorages for the substrates involved. Submittals shall also show shelf construction and materials used in manufacture.
   2. Shelf standards and brackets, include manufacturers suggested anchorage requirements.
   3. Wood gate and fencing construction and required operating and locking hardware for gate.
   4. Wardrobe Rod Assembly: Manufacturer's product data and shop drawings. Indicate materials, finish and suggested anchorage devices for the substrate(s) involved.
   5. Raised Panel Construction: Show wood species, finishes assembly details and anchorage techniques.

B. Samples:
   1. Wood Trim and Moldings: 2 Samples of each profile, 24" long (moldings and trim), with finish applied.
   2. Plastic Laminate: Color chips for review and color selection.
   3. One (1) physical sample of wood panel construction with finish applied.
   4. Wood gate construction and required operating and locking hardware for gate.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protect materials during transit, delivery and handling to prevent damage, soiling and deterioration.

B. Inspect all materials delivered and reject all not qualifying completely with the requirements, damaged in transit or in handling, or otherwise unsatisfactory.

C. Deliver, store and handle cabinets in a manner to prevent damage and deterioration. Defer delivery to job until the installation and storage areas are complete and dry of all wet-type construction. Relative humidity in storage areas shall he maintained at and shall not exceed 60 percent.

1.06 JOB CONDITIONS

A. Do not install finish carpentry until required temperature and relative humidity conditions have been stabilized and will be maintained in installation areas.

B. Maintain temperature and humidity in installation area as required to maintain moisture content of the installed finish carpentry within 10% tolerance of optimum moisture content, from date of installation through remainder of construction period.

C. This project has Interior Design Drawings. The Contractor is to verify with the Interior Design Drawings prior to applying any of the following items contained in Part 2 of the following Specification to the building's interior. Interior items addressed within this Specification that are not addressed in the Interior Design Documents shall be applicable to this Specification over the Interior Design Drawings.

PART 2 PRODUCTS

2.01 MATERIALS

A. Shelving - All shelving shall be painted.
   1. In areas as detailed, shall be 3/4' thick A-B interior APA plywood with hardwood nosing on all edges.
   2. For adjustable shelving, provide wall standards for shelf supports, Knape & Vogt #187 Heavy-Duty Brackets with #87 Heavy-Duty Standards, zinc finish.

B. Interior Trim Material, Raised Panel Material, Moldings and Other Wood Trim and Items as Detailed/Scheduled/lndicated. Refer to Drawings for wood trim profiles.
   1. To Receive Transparent Finish: First Grade, Premium Grade, plain sawn Red Oak, manufactured to sizes, patterns and profiles shown.
   2. To receive Painted Finish: Poplar, vertical grain: finger jointed material will be acceptable.

C. Wardrobe Shelf and Rod
   1. Shelf: 3/4" Thick plywood with high-pressure plastic laminate on all surfaces and edges, except front edge. Provide hardwood nosings, as detailed, with high-pressure plastic laminate over surfaces and edges.
   2. Coat Rod and Bracket: Similar to Beverly Coat Hanger Company 901 Series: provide length(s) as required.

D. Plastic Laminate: Plastic laminate shall comply with NEMA LD-3. Provide the following:
   1. GP 50: Horizontal Grade.
   2. 6P28: Vertical Grade.
   3. Acceptable Manufacturers of Plastic Laminate are:
      a. Formica Corporation.
      b. Nevanar Corporation.
      c. Ralph Wilson Plastics Company.

E. Plywood: Comply with U.S. Product Standard PS I, Group 1, Douglas Fir unless otherwise specified or noted.
   1. Use exterior grade only, without visible patches or repairs on exposed sides.
   2. A-B Grade: Where both faces are exposed.
   3. A-C Grade: Where only one face is exposed.

F. Wood Glue: Waterproof type as recommended by AWL standards for the particular application.

G. Adhesive - Non-Flammable:
   1. DAP Weld-Wood, Non-Flammable Type as manufactured by Beecham Products Inc. of Dayton. Ohio.
   2. Penacolite - CII 49A/Oi 1131 B or CLI 24. as manufactured by Koppers Conipaty, Inc. (If Pittsburgh Pennsylvania.
   3. Molded Trim Adhesive: As recommended by molding manufacturer for intended use.

H. Maintenance Area Work Bench:
   1. Framing: Comply with requirements of Section 06100. Provide No. 2 SYP for support framing.
   2. Bench Top: 3/4" Exterior. B-D, APA certified sheathing. Provide hardwood nosing on exposed edges and ends, including splash.

2.02 FABRICATION

A. Woodwork:
   1. Interior trim shall be "Premium Grade" manufactured from solid stock meeting the following requirements:
      a. Minor warp which can be held flat and straight with normal nailing.

b. Natural and manufacturing defects in excess of those permitted in the grade specified are permitted if such defects are to be covered by adjoining members or otherwise concealed.
c. Trim members for application on flat surfaces shall have the reverse side ‘backed out”, except members with exposed ends.
d. Custom grade pieces shall be smoothly machined with top flat surfaces machine sanded. Depressed flat surfaces and molded contours shall be smoothly machined.

2. Carefully fit equipment to be installed into millwork. Provide filler pieces when required.
3. Protection: Exposed ends of millwork to be sealed with two coats of spar varnish.

PART 3 EXECUTION

3.01 INSTALLATION

A. Inspect all materials delivered and reject all not qualifying completely with the requirements, damaged in transit or in handling, or otherwise unsatisfactory.

B. All finish carpentry shall be executed by skilled mechanics in strict accordance with the details. Protect finish carpentry items against dampness during and after delivery. Store under cover in well ventilated spaces, not exposed to extreme changes in temperature and excess humidity. Make fleld measurements where required for close fit.

C. Install with minimum number of joints possible, using full-length material to greatest extent possible. Stagger joints in adjacent and related members. Cope at returns; miter at corners to produce tight fitting joints with full surface contact throughout the length of the joint. Use scarf joints for end-to-end joints.

D. Secure work to grounds, otherwise fasten in position to hold correct surfaces, lines, levels. Make finished work flat, plumb, true.

E. Loose Joints: Use judgment in locating loose joints to render them inconspicuous as possible in finished work.

F. Fastenings: As far as possible conceal fastenings; where not possible locate then in inconspicuous places. Where nailing is permitted through wood work face, conceal nail heads.

G. Expansion Joints: Construct to permit sections to expand and contract without buckling. warping, causing other conditions which will detract from appearance, durability.

H. Set all nail heads. Counter-sink all screw heads.

I. Gates: Install hoards on steel gate frames plumb and level, with gap between boards as detailed. Remove hoards that are split, where split is a result of installation and al boards that are otherwise damaged.

3.02 CLEANING

A. At the completion of this work, remove from the job site all excess materials and debris. Leave entire work ready to receive the specified or scheduled finish.

3.03 PROTECTION

A. Protect finished installations from damage until date of Substantial Completion. Repair or replace any damage at no additional cost to the Owner as directed by the Architect.

END OF SECTION

SECTION 06251

SLOTTED DISPLAY PANELING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prefinished slotted panel system for merchandise display.

1.02 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's product data sheets on each product to be used and installation instructions.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Store panels in cool dry environment. Do not subject to moisture.

B. Do not stack panels directly on floor.

1.04 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.

B. This project has Interior Design Drawings. The Contractor is to verify with the Interior Design Drawings prior to applying any of the following items contained in Part 2 of the following Specification to the building's interior. Interior items addressed within this Specification that are not addressed in the Interior Design Documents shall be applicable to this Specification over the Interior Design Drawings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Marlite; 202 Harger Street, Dover, OH 44622. ASD. Tel: (330) 343-6621. Fax: (330) 343-7296. Email: info@marlite.com www.marlite.com

B. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Slotted Display Panels: Marlite Displawall; prefinished medium density fiberboard with engineered grooves designed to fit standard merchandising fixtures.
   1. Fiberboard: 48 pcf density; internal bond strength of 110 psi; formaldehyde emission of 0.3 ppm or less; complying with 24 CFR 3280.
   2. Panel Size: 48 by 96 inches, plus minus 0.0625 inch, with squareness tolerance of 0.125 inch on diagonal.
   3. Thickness: 3/4 inch plus/minus 0.008 inch.
   4. Groove Spacing: 4 inches on center, plus/minus 0.015 inch.
   5. Surface Finish: Marlite melamine finish.
   6. Surface Color/Pattern: As selected from manufacturer's standard selection.
   7. Groove Finish: None.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until building is completely enclosed and interior conditions are being maintained as intended during occupancy; approximately 70 degrees F.

3.02 PREPARATION

A. Open cartons and allow product to acclimatize to room conditions for at least 48 hours prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer.

C. Protect existing surfaces from damage due to installation.

3.03 INSTALLATION

A. Install in strict accordance with manufacturer's instructions, especially in regard to fastening and bracket spacing necessary to achieve optimum capacity.

B. Avoid contamination of panel faces with adhesives, solvents, or cleaners; clean as necessary and replace if not possible to repair to original condition.

C. Protect installed products until completion of project.

D. Touch-up, repair or replace damaged products after Substantial Completion.

END OF SECTION

SECTION 06415

CABINETRY AND MILLWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Includes but not limited to the materials, manufacture and installation or:
   1. Plastic laminate countertops. aprons and backsplashes.
   2. Custom manufactured cabinetry, casework and millwork.
   3. Pre-manufactured vanity base units for Guest Rooms.
   4. Other items as indicated on the Drawings.

1.02 RELATED SECTIONS

A. Section 06100- Rough Carpentry: Treated wood blocking required for the installation of cabinetry and millwork items.
   1. Section 06200 - Finish Carpentry: Applicable portions apply to this Section for materials, manufacture and installation.
   2. Section 06415 - Marble and Granite: Tops for cabinetry and millwork.
   3. Section 09900 - Painting: Completion of painting operations prior to installing cabinetry and millwork items.
   4. Section 09260 - Gypsum Wallboard: Completion of the gypsum wallboard installations prior to cabinetry and millwork installations. Substrate for window sills'.
   5. Section 09300 - Tile: Coordination of tile flooring and base installation with the setting in place or the cabinetry and millwork.
   6. Section 09720 - Wallcovering: Coordination of wallcovering installation with installation or cabinetry and millwork.

1.03 QUALITY ASSURANCE

A. Woodworking Standards:
   1. Design and Construction Features: Comply with details shown for profile and construction of tops and cabinetry. Where not otherwise shown, comply with applicable AWl Quality Standards, with alternate details and fabrication option.
   2. Architectural Cabinets, Wood Veneer with Transparent Finish: Awl Section 400 for Reveal Overlay, Premium Grade.
   3. Architectural Cabinets, Laminate Clad: AWL Section 400 for Reveal Overlay for plastic laminate construction, Custom Grade.
   4. Architectural Cabinets, Tops: AWl Sections 400 for High Pressure Decorative Laminate Tops and 400C; Custom Grade.
   5. Miscellaneous Ornamental Items: AWl Section 700; Premium Grade.
   6. Installation: Comply with requirements of the Architectural Woodwork Institute, AWl Section 1700.

B. Provide complete installation of cabinetry and millwork sample Guest Room for Architects review prior to installation in any other areas. This installed and approved installations shall establish the standard of workmanship in all other Guest Rooms.

1.04 SUBMITTALS

A. Submit copies of shop drawings and technical data and two (2) physical samples of cabinet material and top with finishes applied to the Architect in accordance with Section 01300. Shop drawings shall show all cabinet/millwork layouts with Room Numbers indicated, materials, construction, joinery, species of wood and finish(es).

B. Submit plastic laminate color chips for Architect's color selection. Submit millwork samples with finish applied. as directed by the Architect.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver store and handle cabinetry and millwork items in a manner to prevent damage and deterioration. Defer delivery to job until the installation and storage areas are complete and dry of all wet-type construction. Relative humidity in storage areas shall be maintained at and shall not exceed 60 percent.

1.06 JOB CONDITIONS

A. Do not install carpentry or millwork until required temperature and relative humidity conditions have been stabilized and will be maintained in installation areas.

B. Maintain temperature and humidity in installation area as required to maintain moisture content of the installed finish carpentry within 10% tolerance of optimum moisture content, from date of installation through remainder of construction period.

C. This project has Interior Design Drawings. The Contractor is to verify with the Interior Design Drawings prior to applying any of the following items contained in Part 2 of the following Specification to the building's interior. Interior items addressed within this Specification that are not addressed in the Interior Design Documents shall be applicable to this Specification over the Interior Design Drawings.

PART 2 PRODUCTS

2.01 GENERAL

A. All Cabinetry, Millwork and Tops shall be factory fabricated and delivered to the job site completely finished with hardware installed. All glue used in millwork manufacturing shall he waterproof, as recommended by AWl for the particular application involved. Cabinetry will be provided with plastic laminate finish and transparent finish; refer to Drawings for locations of each type cabinetry. All cabinets shall have almond color melamine liner.

B. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures and fittings.

2.02 PLASTIC LAMINATIS COUNTERTOPS, APRONS, BACKSPLASFIES

A. Plastic Laminate: Shall be standard grade, 1/16' thick, general purpose material complying with current NEMA Standard and LD-3. Comply with ANSI A161.2. Provide the following:

B. GD 50: Horizontal Grade.

C. GP2S: Vertical Grade.

D. CL 20: Cabinet Liner.

E. BK 20: Backing Sheet.

F. PF-40: Post Forming Grade.

G. FR 32: Vertical application, fire retardant material.

H. Plastic Laminate Acceptable Manufacturers
   1. Formica Corporation
      a. WilsonArt International, Inc.
      b. Laminart
      c. Nevamar/International Paper Products

2. Core:
    a. Particleboard. complying with ANSI A2081, 45-lb. Minimum density, 3/4" thick fire retardant type in accordance with ASTM E 84 and the following:
        1) Flame Spread: 25 maximum
        2) Smoke Developed: 25 maximum
        3) Fuel Contributed: 25 maximum
    b. Manufacturers:
        1) 'X-Flame; Masonite Corporation
        2) "Duraflake FR"; Williamette Industries, lnc.
3. Adhesives:
    a. Wood Glue: Waterproof types as recommended by AWl standards for the particular application.
    b. Plastic Laminate: Provide one (1) of the following products subject to conformance with the requirements specified.
        1) Non-Flammable:
            (a) 'DAD Weld-Wood, Non-Flammable Type' - DAD, Inc.
            (b) Molded Trim Adhesive - As recommended by molding manufacturer for intended use.
4. Where shown, all countertops shall have 3/4" x 4" high separate matching backsplash and matching aprons.
5. In locations as required by local codes or ordinances, provide fire retardant countertop assemblies, as tested in accordance with ASTM F 84.

2.03 WOOD CABINETRY, TRANSPARENT FINISH, REVEAL OVERLAY

A. Hardwood Plywood: ANSI/HPMA HP hardwood and decorative plywood, of thickness, species, cut, and core construction as indicated.

B. Hardwood Lumber: Clear, dry, sound, and free of defects selected from First Grade lumber (NHLA), of species indicated.

C. Hardboard: ANSI Al35.4, Class I, tempered.

D. Solid Lumber: Dry, sound, selected to eliminate appearance detects, of any species of hardwood or softwood with color and grain characteristics similar exposed portions.

E. Plywood Face Veneer: Species and cut as shown on the drawings. Premium Grade. Edgeband exposed edges with solid wood of same species as face veneer.

F. Style of face construction for base, wall, and frill-height units, if any, with drawer fronts, doors, and fixed panels as follows:
    1. Panel, concealing face frames of cabinet body.
    2. Panel Door Construction: Lumber core plywood, 5-ply with hardwood lace veneer and crossbanding.
    3. Drawer Front Construction: Same as door or, where standard with manufacturer, solid or glued-up lumber, not less than 1/2' thick.

G. Construction for face frame style casework as follows:
    1. Rails and Stiles: Not less than 1-inch by l-5/8 inch solid timber with glued mortise and tendon joints.
    2. Exposed Ends: Not less than 1/2 inch thick, medium-density particle hoard core with exterior veneer to match door and drawer fronts and not less than 4-mil vinyl laminate on interior surfaces. Connect to stile with pressure-glued tongue and plow joint and supplement by concealed mechanical fasteners.

3. Unexposed Ends: Not less than 1/2 inch thick. medium density particle board with not less than 4-mil pre-finished vinyl laminate on interior surfaces. Attach to front frame in same manner as exposed ends.
4. Back, Top, and Bottom Rails: Not less than 3/4 inch by 3 inch solid lumber, machined to interlock with end panels, and rabbeted to receive top and bottom panels; with back rails secured under pressure with glue and mechanical fastening devices.
5. Shelving: Not less than 5/8 inch thick particle board core plywood or 1/2 inch thick medium-density particle board pre-finished with melamine finish on top, bottom, and exposed (front) edge.

H. Construction for wall units with doors and fixed panels as follows:
1. Tops and Bottoms: Not less than 1/2 inch thick particle hoard or 3/8 inch thick hardwood plywood, fully supported by and secured in rabbets in end panels, front frame, and back rail.
2. Backs: Not less than 1/8 inch hardboard or 3/16 inch plywood fastened to machined rear edge of ends and to top and bottom hanger rails.

I. Construction for base units with doors and fixed panels as follows:
1. Front Frame Drawer Rails: Not less than 1 inch by 1-1/4 inch lumber mortised and fastened into face frame.
2. Bottoms: Not less than 1/2 inch thick particle hoard with 4-mil vinyl laminate finish or 3/8 inch thick, 5-ply veneer core plywood, fully supported by and secured in rabbets in end panels, front frame, and back bottom rail.
3. Back Panels: Not less than 1/8 inch thick hardboard fastened to machine rear edge of end panels and to top and bottom rails. Interior surface pre-finished with 4-mil vinyl laminate
4. Toe Boards: Not less than 5/8 inch particle board core attached between end panels and extended from bottom panel to floor.
5. Corner Blocks: Glued and fastened in each of four top corners to maintain cabinet squareness and rigidity.

J. Construction for Drawer Units: Drawer body shall be not less than 3/8 inch thick vinyl faced particle board sub-front, back, and sides. Provide box-type construction with sub-front and back rabbeted into sides and secured with glue and mechanical fasteners. Exposed fronts fastened to sub-front with mounting screws from interior of body. Drawer bottom of not less than 1/4 inch thick hardboard, set into rabbets in back, sides, and front.

2.04 PLASTIC LAMINATE FACED CABINETRY

A. All cabinetry shall be factory fabricated and delivered to the job site completely finished with hardware installed. The inside surfaces of all cabinets shall have liner panel. All glue used in millwork manufacturing shall be waterproof, as recommended by AWl for the particular application involved.

B. Cabinet Construction: Comply with requirements specified under Paragraphs 2.03 G, H, I, and J, as applicable.
1. Reveal overlay design with plastic laminate finish on all exposed surfaces and edges.
2. Cabinet Front Frame: Solid hardwood, 3/4” thick. Provide plastic laminate applied to exposed surfaces and edges.
3. Backing Sheet: Provide hacking sheet on all doors and drawer heads.
4. Particleboard, plastic laminate and adhesives shall be as specified for plastic laminate countertops. except that particleboard for cabinet construction shall be 53-lb. density.

2.05 PREMANUFACTURED VANITY BASE UNITS FOR GUEST ROOMS

A. Provide manufactured units as manufactured b y JTB Furniture of Columbus Mississippi.
1. Serpentine Leg Design: Model No. 9402-84-055 & 9402-84-065.

B. Finish: As selected by Architect. A pre-catalyzed finish system is required.
   1. 1421C00574 Pre-Cat Sealer.
   2. 1706C20225 Pre-Cat Top, Sealer.
   3. Provide blocking underneath skirt for mounting of toilet paper holder.
   4. Coordinate manufacture of base units with plumbing rough-in and trim requirements.

2.06 CABINET HARDWARE

A. Hardware: As manufactured by Hafele America Company of Archdale, North Carolina. Coordinate hardware finishes with cabinet finishes and that of the surrounding finish hardware items.

2.07 FABRICATION

A. General:
   1. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
   2. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trip for scribing and site cutting.
   3. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings.
   4. Carefully fit equipment to be installed into millwork. Provide filler pieces when required.
   5. Protection: Exposed ends of millwork to be sealed with two coats of spar varnish. See Section 09900-Paints and Coatings.

B. Plastic Laminate Work:
   1. Self edge tops with same grade of laminate as top surface unless indicated otherwise.
   2. Counters and work tops with sinks: Apply trim and edging prior to surface sheet. Substrate for back splashes and at edges shall be trimmed lumber. Use only exterior grade or marine grade Plywood near wet areas. All adhesives used near water shall be formulated to be especially water resistant.
   3. Apply veneers or plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Make corners and joints hairline. Locate counter butt joints minimum 2 feet from sink cut-outs.
   4. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces, where shown on Drawings.

PART 3 EXECUTION

3.01 INSTALLATION

A. Installation of all cabinetry and millwork items shall comply with the Quality Assurance section of this specification.

B. Cabinetry and millwork items shall be mounted and set into place in accordance with the approved shop drawings. All work shall be straight, plumb, level and in true alignment. Fit all joints closely and fasten all pieces rigidly in place. Coordinate installation of cabinetry in Suites with Owner-provided appliance installations.
   1. Use threaded steel concealed joint fasteners to align and secure adjoining cabinet units and counter tops.
   2. Carefully scribe casework which is against other building materials, leaving gaps 1/32-inch maximum. Do not use additional overly trim for this purpose.
   3. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
   4. Countersink anchorage devices at exposed locations used to wall-mount components, and conceal with solid plugs of species to match surrounding wood. Finish flush with surrounding surfaces.

C. All hardware shall be demonstrated to operate properly. Drawer units shall slide freely without bind. Doors shall remain open in any position beyond the closing mechanism of the hinges.

3.02 ADJUSTING AND CLEANING

A. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly.

B. Clean casework, counters, shelves, hardware, fittings and fixtures.

C. Clean surfaces of plastic laminate with a damp cloth or ordinary bar soap and water. Harsh abrasive cleaners shall not be used. Stubborn dirt may be removed with lacquer thinner, methlethyl Ketone, contact adhesive solvents or cleaner waxes.

3.03 PROTECTION

A. Completed installations shall be protected from damage until the date of Substantial Completion. Cabinet work, millwork and other items damaged prior to Substantial Completion shall be repaired or replaced at no expense to the Owner.

END OF SECTION

SECTION 06605

FIBERGLASS REINFORCED PLASTIC PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fiberglass reinforced polyester panel system for adhesive mounting.

B. Moldings, adhesive, and joint sealants.

1.02 REFERENCES

A. ASTM D 256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2005a.

B. ASTM D 570 - Standard Test Method for Water Absorption of Plastics; 1998.

C. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics; 2003.

D. ASTM D 696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degrees C and 30 degrees C With a Vitreous Silica Dilatometer; 2003.

E. ASTM D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2003.

F. ASTM D 792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement; 2000.

G. ASTM D 1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes; 2002.

H. ASTM D 2486 - Standard Test Methods for Scrub Resistance of Wall Paints; 2000.

I. ASTM D 2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor; 1995 (Reapproved 2001).

J. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. 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.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.05 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

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Marlite; 202 Harger Street, Dover, OH 44622. ASD. Tel: (330) 343-6621. Fax: (330) 343-7296. Email: info@marlite.com www.marlite.com

2.02 PANEL SYSTEM

A. Plastic Panel System: Factory finished panels, trim, sealant, and accessories.

B. Panels: Marlite FRP Panels; fiberglass reinforced polyester, USDA approved for incidental food contact.
   1. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E 84 (Class A/I).
   2. Surface Texture: Gently pebbled, high-gloss.
   3. Color: As selected from manufacturer's standard selection.
   4. Thickness: 3/32 inch, nominal.
   5. Width: 48 inches.
   6. Height: 96 inches.
   7. Flexural Strength: 10,000 psi, when tested in accordance with ASTM D 790.
   8. Flexural Modulus: 3,100 psi, when tested in accordance with ASTM D 790.
   9. Tensile Strength: 7,000 psi, when tested in accordance with ASTM D 638.
   10. Tensile Modulus: 1,600,000 psi, when tested in accordance with ASTM D 638.
   11. Barcol Hardness: 35, when tested in accordance with ASTM D 2583.
   12. Impact Resistance: 7.2 ft-lb/in, when tested in accordance with ASTM D 256, Izod method.
   13. Coefficient of Thermal Expansion: 0.0000157 in/in/degree F, measured in accordance with ASTM D 696.
   14. Water Absorption: 0.72 percent, when tested in accordance with ASTM D 570.
   15. Specific Gravity: 1.8, when tested in accordance with ASTM D 792.

C. Panel Trim: Extruded PVC, in manufacturer's standard colors.
   1. Outside corners, inside corners, edge trim, and division molding.

D. Sealant: Marlite Silicone Sealant; gunnable silicone rubber; clear.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Take panels out of cartons and allow to acclimatize to room conditions for at least 48 hours prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Clean surfaces thoroughly prior to installation.

D. Protect existing surfaces from damage due to installation.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Use the adhesives recommended by the panel manufacturer unless prohibited by local regulations; obtain manufacturer's approval of alternative adhesives.

C. Install continuous bead of silicone sealant in each joint and trim groove and between trim and adjacent construction, maintaining 1/8 inch expansion space.

D. Avoid contamination of panel faces with adhesives, solvents, or cleaners; clean as necessary and replace if not possible to repair to original condition.

E. Protect installed products until completion of project.

F. Touch-up, repair or replace damaged products after Substantial Completion.

END OF SECTION

SECTION 06610

GLASS FIBER REINFORCED PLASTIC FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass fiber reinforced plastic fabrications as indicated on the drawings.

1.02 RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Supplementary supports for large items.

B. Section 06100 - Rough Carpentry: Supplementary supports for large items.

C. Section 09900 - Paints and Coatings: Field painting and sealing prior to painting.

1.03 REFERENCES

A. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics; 2003.

B. ASTM D 695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2002a.

C. ASTM D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2003.

D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including dimensions, finishes, storage and handling requirements and recommendations, and installation recommendations.

C. Shop Drawings: For custom items, provide drawings showing dimensions, layout, joints, details, and interface with adjacent work; include field measured dimensions of the spaces where items are to be installed, if critical to proper installation.

D. Samples: For each custom finish specified, two samples, minimum size 6 inches square, representing actual product, color, and patterns.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Transport, lift, and handle units with care, avoiding excessive stress and preventing damage; use appropriate equipment.

B. Store products in manufacturer's unopened packaging until ready for installation, in a clean dry area off the ground and protected from weather, moisture and damage; store units upright and not stacked unless permitted by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Stromberg Architectural Products Inc; PO Box 8036, I-30 West, 4400 Oneal, Greenville, TX 75404. ASD. Tel: (903) 454-0904. Fax: (903) 454-3642. Email: stromberg@koyote.com. www.strombergarchitectural.com.
   2. CBL, Inc Architectural Fiberglass; 4921 Lake Drive, Memphis, TN 38117, Tel: (901) 685-0046
   3. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Glass Fiber Reinforced Plastic Fabrications: Molded surface coat over polyester resin laminate reinforced with glass fiber and structural reinforcing as required.
   1. Surface Coat: Ultraviolet inhibited NPG-ISO polyester gel coat, 20 mils thick, nominal.
   2. Color: to be selected by the Architect.
   3. Texture on Exposed Side: to be selected by the Architect.
   4. Resin: Isophthalic polyester resin; with flame spread index less than 25, smoke developed index less than 450, when tested in accordance with ASTM E 84; heat distortion greater than 180 degrees F, when tested in accordance with ASTM D 648.
   5. Glass Fiber: "E" type random chopped fibers.
   6. Glass Content: 25 to 30 percent by weight.
   7. Shell Thickness: 3/16 inch, minimum.
   8. Surface Burning Characteristics: Flame spread index of less than 25, smoke developed index of less than 450, when tested in accordance with ASTM E 84.
   9. Flexural Strength: 29,000 psi, when tested in accordance with ASTM D 790.
   10. Modulus of Elasticity: 0.9 x 10^6 psi, when tested in accordance with ASTM D 790.
   11. Tensile Strength: 14,0000 psi, when tested in accordance with ASTM D 638.
   12. Compressive Strength: 18,000 psi, when tested in accordance with ASTM D 695.
   13. Bearing Strength: 9000 psi, when tested in accordance with ASTM D 638.
   14. Thermal Expansion Coefficient: 10 x 10^-6 per degree F.
   15. Variation in Thickness From Nominal: Minus 1/16 inch, plus 1/4 inch.
   16. Variation in Thickness of Gel Coat: Plus and minus 2.5 mils, maximum.
   17. Variation from Dimensions Indicated on Drawings: Plus and minus 1/8 inch, maximum.
   18. Variation from Square: Plus and minus 1/8 inch, maximum.
   19. Variation of Hardware From Intended Location: Plus and minus 1/4 inch, maximum.
   20. Provide concealed reinforced anchorage points for anchors of type recommended by manufacturer.
   21. Mark each unit with permanent serial number coordinated with shop drawing designators.
   22. Cure and clean prior to shipment; remove material that may be toxic to plant or animal life or incompatible with adjacent building materials.
   23. Large flat areas (in excess of 12") of the profiles are to be fabricated with synthetic sandwich core or equivalent. Sandwich core (or equivalent) is required for panel stiffness and flexural strength to prevent warpage, bowing and oil-canning and to provide sound anchorage to withstand wind and seismic forces.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly constructed; verify that substrates are plumb and true.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Check field dimensions before beginning installation. If dimensions vary too much from design dimensions for proper installation, notify Architect and wait for instructions before beginning installation.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Install supplementary temporary and permanent supports as required for proper installation.

3.03 INSTALLATION

A. Install in accordance with applicable code and manufacturer's recommendations, plumb and true to line; shim where necessary.

B. Install with variation from position shown on drawings not more than 1/4 inch in 10 feet; align horizontal and vertical joints.

C. Fasten using methods that allow for thermal expansion and contraction.

D. Provide control joints at not more than 35 feet on center if not indicated on drawings.

E. Provide expansion joints where moving joints in substrate occur.

3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 06615

MARBLE AND GRANITE FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Synthetic marble tub and shower surrounds, with related accessories.

B. Synthetic marble countertops with cutout for undermount lavatory bowls.

C. Synthetic marble countertops with integral lavatory bowls.

D. Synthetic marble windowsills, thresholds, and other flat items.

1.02 RELATED SECTIONS

A. Section 07900 - Joint Sealers.

B. Section 09300 - Tile: Shower floor and base.

C. Section 15145 - Plumbing Piping.

D. Section 15146 - Plumbing Specialties.

1.03 REFERENCES

A. ANSI Z124.3 - American National Standard for Plastic Lavatories; American National Standards Institute; 2005.

B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data:
   1. Manufacturer's printed product data indicating compliance with specified requirements.
   2. Manufacturer's cleaning and maintenance data.

C. Shop Drawings:
   1. Submit plans, elevations, and detail sections.
   2. Indicate overall dimensions, material thickness, location and size of cutouts, anchorage provisions and attachment methods.
   3. Indicate coordination requirements for adjacent and interfacing work.

D. Selection Samples: For each product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches square, representing actual product, color, and patterns.

F. Quality Control Submittals:
   1. Test reports indicating compliance with performance requirements.
   2. Certificate of membership in ICPA.
   3. Toxic Chemical Release Inventory Reporting Form R and Instructions, Section 313 of the Emergency Planning and Community Right-to-Know Act, Revised 1990 Version.
   4. Installer qualifications as specified under Quality Assurance article below.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Member of International Cast Polymer Association (ICPA), with not less than five years of experience in manufacturing products similar to those required for this project.

B. Installer Qualifications: Not less than five installations of comparable scope within the past three years.
   1. Provide list of contacts for recently completed projects.
   2. Architect may inspect installations and reject proposed installer on the basis of references or quality of work.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques, application workmanship, and overall appearance of installation.
   1. Install complete set of products in area designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen have been approved by Architect.
   3. Approved mock-up may become part of the work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Pack countertops, tub and shower surrounds, and other flat products in wooden crates to minimize shipping damage. Palletize other components.

B. Check for shipping damage during unloading at site and notify manufacturer immediately of any obvious damage.

C. Store products under cover, off the ground, and protected from moisture. Handle products to prevent physical damage. Protect surfaces from staining, scratching, and other damage during handling and installation.

1.07 PROJECT CONDITIONS

A. Field Measurements: Verify shop drawings with field measurements.

B. Coordination: Coordinate construction activities of this section with construction activities specified in related sections.

1.08 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Tub Surrounds and Other Flat Products: Manufacturer's standard ten-year limited warranty on defective materials.

C. Window Sills, Thresholds, and Other Flat Items: Manufacturer's standard ten-year limited warranty on defective materials.

1.09 JOB CONDITIONS

A. This project has Interior Design Drawings. The Contractor is to verify with the Interior Design Drawings prior to applying any of the following items contained in Part 2 of the following Specification to the building's interior. Interior items addressed within this Specification that are not addressed in the Interior Design Documents shall be applicable to this Specification over the Interior Design Drawings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer of Cultured Marble Tub/Shower Surronds: Mincey Marble Manufacturing, Inc; 4321 Browns Bridge Road, Gainesville, GA 30504. ASD. Tel: 800-533-1806. Fax: 770-531-0935.

B. Acceptable Manufacturerof Cultured Granite Shower Pan: Sterling by Kohler of Kohjler, Wisconsin

C. Acceptable Manufacturers of Belstone Granite for Vanity/Counter Tops/Window Sills: Belstone Marble and Granite of Van Nays, CA.

2.02 MATERIALS

A. Provide cast marble fabrications made of proprietary resin and gel coat finish with finished properties as described under specific product types.

B. Adhesives and Sealants: As specified in Section 07900, and as follows:
   1. To adhere cast marble panels to gypsum wallboard, use LN-601 Liquid Nails, Nail-No-More, or other product recommended by manufacturer.
   2. For joints between cast marble panels, use a mildew resistant 100 percent silicone joint sealer; siliconized calking compound is not acceptable.
   3. For sealing cast marble panels at adjoining surfaces such as gypsum wallboard, use mildew resistant acrylic calk joint sealer, such as Phenoseal Acrylic Caulk by Gibson-Homans, or other product recommended by cast marble panel manufacturer.

C. Polishing Cream: As recommended by manufacturer.

2.03 TUB AND SHOWER SURROUNDS

A. Material: MINCOR(tm) panels; flame spread of 25 or less and smoke developed of 450 or less (Class A), when tested in accordance with ASTM E 84.

B. Panel Dimensions: Thickness of 1/4 inch; height and width as indicated on the drawings; back panel in one piece.

C. Trim and Accessories: Matching trim and accessory pieces, of same material and color as wall panels. Provide accessories as follows:
   1. Tub Surround: Provide 1/4” thickness material with all exposed surfaces and edges finished. Provide trim pieces as required for complete and watertight installations, including 1/2” thick x 2” wide edge trim to cover exposed vertical edges.
   2. Provide two (2) soap dishes at each tub. Soap dishes of the same material to match the wall panels. Soap dishes at tubs shall be 6-1 1/16”x3-518”, without washcloth holder. Refer to Drawings for locations of soap dishes at tubs and showers; match color of wall panels.

D. Color and Pattern: As selected from manufacturer's standards.

2.04 VANITY TOPS AND COUNTERTOPS

A. Granite Vanity/Counter Tops: Refer to Drawings for configurations of granite installations. Coordinate locations and sizes of openings and cut-outs with the appropriate trade. All exposed edges shall be eased. Provide skirts and stools as detailed. Color(s) shall be as selected by the Architect.
   1. Vanity tops shall be minimum 3/4” thickness with edge profile as detailed, polished lavatory cutout for underslung bowl. Splash shall have separate 4” high back and side splashes with polished and eased edges. Skirt shall be 10” wide for Public Toilets and 8” wide for Guestroom Baths, in one (1) piece for straight vanities and three (3) pieces with a single curved radius centerpiece and two (2) side strip pieces (bowed front vanities). Provide cut-outs as detailed for tissue dispenser. All fasteners and anchorages shall be concealed from view. Secure bowl with a minimum of four (4) clips per bowl.
   2. Countertops: 1-1/4” Thickness with bullnose edge profile, unpolished sink cutout for drop-in sink, as applicable; install over solid substrate. Splashes, where indicated, shall be separate 4” high back and end splashes.

B. Color and Pattern: As selected from manufacturer's standards.

2.05 WINDOW SILLS, THRESHOLDS, AND OTHER FLAT ITEMS

A. Granite Window Sills: 3/4” Thick with all exposed surfaces and edges having unpolished finish. Exposed edges shall be eased.

B. Color and Pattern: As selected from manufacturer's standards.

2.06 FABRICATION

A. Use molds, materials, methods, and procedures that will result in proper texture and finish.

B. Fabricate to required profiles and dimensions. To the greatest extent possible, fabricate each unit as a continuous piece, without joints, and configured to minimize on-site cutting or other modifications.

C. Ease all edges and sand smooth; provide uniform gloss finish on all exposed surfaces.

D. Cure components prior to shipping, and remove traces of material that may be toxic or incompatible with other building materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

A. General: Install in accordance with manufacturer's instructions and approved shop drawings. Install components to be plumb, level, and rigid. Neatly scribe to adjoining surfaces, and field trim as required for snug fit. Replace any component that is cracked, chipped, broken, or otherwise defective.

B. Tub and Shower Surrounds: Cut openings as required for installation of plumbing fittings. Secure soap dishes to panels with silicone joint sealer, as recommended by panel manufacturer. Install panels 1/4 inch above rim of tub or shower pan for subsequent installation of joint sealer.

C. Vanity Tops and Lavatory Countertops: Install on rigid wooden framework, following manufacturer's recommended procedures.

D. Window Sills: Attach to solid substrate with silicone joint sealer, as recommended by manufacturer.

3.03 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged components before Substantial Completion.

END OF SECTION

SECTION 07130

SHEET WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sheet membrane waterproofing.

1.02 RELATED SECTIONS

A. Section 02316 - Fill and Backfill.

B. Section 03300-Cast-in-Place Concrete: Concrete substrate below grade for horizontal and vertical surfaces including under elevator pit walls and slab.

C. Section 07900 - Joint Sealers: Sealant for joints in substrates.

1.03 REFERENCES

A. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension; 2006a.

B. ASTM D 570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2005).

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for membrane, flexible flashings, joint cover sheet, and joint and crack sealants.

C. Manufacturer's Installation Instructions: Indicate special procedures.

D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Membrane Manufacturer Qualifications: Company specializing in waterproofing sheet membranes with three years experience.

B. Installer Qualifications: Company specializing in performing the work of this section approved by manufacturer.

1.06 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.

C. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water, except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Laminated Composite Manufacturers:
   1. Grace Construction Products: www.na.graceconstruction.com.

2.02 MEMBRANE MATERIALS

A. Sheet Waterproofing - General: Laminated composite membrane, adhesive bonded.
   1. Capable of resisting water head of 150 feet and preventing moisture migration to interior.
   2. Product: Bituthene 4000 manufactured by W.R. Grace & Co.

B. Composite Laminate Membrane: Comprised of.056 inch thickness of rubberized-asphalt and a.004f inch thickness of cross-laminated polyethylene film;.060 inch total thickness.
   1. Sheet Width: 36 inch, minimum.
   2. Tensile Strength: 250 psi, measured in accordance with ASTM D 412.
   3. Ultimate Elongation: 300 percent, measured in accordance with ASTM D 412.
   4. Water Absorption: 0.1 percent increase in weight, maximum, measured in accordance with ASTM D 570, 24 hour immersion.

C. Surface Conditioner: Liquid type, compatible with membrane.

D. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with sheet membrane.

2.03 ACCESSORIES

A. Sealant for Substrate Surfaces: Type as specified in Section 07900.

B. Protection Board: 1/8 inch thick biodegradable hardboard.

C. Drainage Panel: 1/4 inch thick formed plastic, embossed with cover sheet.

D. Flexible Flashings: Type recommended by membrane manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.

3.02 PREPARATION

A. Protect adjacent surfaces not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions. Vacuum substrate clean.

C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.

D. Seal cracks and joints with sealant using depth to width ratio as recommended by sealant manufacturer.

E. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer. Protect conditioner from rain or frost until dry.

3.03 INSTALLATION - MEMBRANE

A. Install membrane waterproofing in accordance with manufacturer's instructions.

B. Roll out membrane. Minimize wrinkles and bubbles.

C. Remove release paper layer. Roll out on substrate with a mechanical roller to encourage full contact bond.

D. Overlap edges and ends and seal by method recommended by manufacturer, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

E. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.

F. Weather lap joints on sloped substrate in direction of drainage. Seal joints and seams.

G. Install flexible flashings. Seal items penetrating through membrane with flexible flashings. Seal watertight to membrane.

H. Seal membrane and flashings to adjoining surfaces.

3.04 INSTALLATION - DRAINAGE PANEL and PROTECTION BOARD

A. Place drainage panel directly against membrane, butt joints, place to encourage drainage downward. Scribe and cut boards around projections, penetrations, and interruptions.

B. Place protection board directly against drainage panel; butt joints. Scribe and cut boards around projections, penetrations, and interruptions.

END OF SECTION

SECTION 07190

WATER REPELLENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water repellents applied to exterior masonry surfaces.

1.02 RELATED SECTIONS

A. Section 07900 - Joint Sealers.

1.03 REFERENCES

A. ASTM D 5095 - Standard Test Method for Determination of the Nonvolatile Content in Silanes, Siloxanes, and Silane-Siloxane Blends Used in Masonry Water Repellent Treatments; 1991 (Reapproved 2002).

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention; cautionary procedures required during application.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Protect liquid materials from freezing.

B. Do not apply water repellent when ambient temperature is lower than 50 degrees F or higher than 100 degrees F.

C. Do not apply water repellents when wind velocity is higher than 5 mph.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Water Repellents:
   1. Tnemec Company, Inc/Chemprobe Masonry Coatings: www.tnemec.com.
   2. BASF Construction Chemicals, Inc: www.chemrex.com.
   3. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Water Repellent: Acrylic modified stearate based; colorless.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify joint sealants are installed and cured.

C. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of water repellent.

3.02 PREPARATION

A. Prepare surfaces to be coated as recommended by water repellent manufacturer for best results.

B. Do not start work until masonry mortar substrate is cured a minimum of 60 days.

C. Remove loose particles and foreign matter.

D. Remove oil and foreign substances with a chemical solvent that will not affect water repellent.

E. Scrub and rinse surfaces with water and let dry.

3.03 APPLICATION

A. Apply water repellent in accordance with manufacturer's instructions, using procedures and application methods recommended for best results.

3.04 PROTECTION OF ADJACENT WORK

A. Protect adjacent landscaping, property, and vehicles from drips and overspray.

B. Protect adjacent surfaces not intended to receive water repellent.

C. Remove water repellent from unintended surfaces immediately by a method instructed by water repellent manufacturer.

END OF SECTION

SECTION 07212

BOARD AND BATT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation and integral vapor retarder at cavity wall construction, perimeter foundation wall, and underside of floor slabs.

B. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction.

C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.02 RELATED SECTIONS

A. Section 07840 - Firestopping.

B. Section 09260 - Gypsum Board Assemblies: Acoustic insulation.

1.03 REFERENCES

A. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2006.

B. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2006.

C. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2007.

D. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2004.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.06 SEQUENCING

A. Sequence work to ensure fireproofing and firestop materials are in place before beginning work of this section.

PART 2 PRODUCTS

2.01 BOARD INSULATION MATERIALS

A. Extruded Polystyrene Board Insulation: ASTM C 578, Type V; Extruded polystyrene board with cut cell surfaces; with the following characteristics:
   1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E 84.
   2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
   3. Rigid Board Insulation Over Interior Surfaces of Masonry Walls: 1" thickness Dow Styrofoam 7-Mate aged R-value of 5.6 @ 250F (ASTM D 2126).
      a. Metal Z-Furring Channels for Securing Gypsum Wallboard to Masonry Walls: 1" deep, 24 gauge hot-dipped galvanized steel, 224 pounds per 1,000 lineal feet
   4. Rigid Board Insulation at Laundry Area and Elevator Equipment Room Ceilings: ¾" thickness extruded polystyrene having a minimum aged R-value of 4.2 @ 75°F, a compressive strength of 25 psi, and a water vapor transmission rate of 0.4 to 1.0 perm-inches. Insulation board must comply with ASTM C 578, Type V.
   5. Slab Perimeter Insulation: 2" thickness (R=10) of Dow Styrofoam SM Board, as manufactrued by Dow Chemical Company of Midland, Michigan.
   6. Manufacturers:
      a. Dow Chemical Co: www.dow.com.
      b. Owens Corning Corp: www.owenscorning.com.
      c. Pactiv Building Products: www.pactiv.com/green-guard/.
   7. Substitutions: See Section 01600 - Product Requirements.

2.02 BATT INSULATION MATERIALS

A. Batt Insulation: ASTM C 665; preformed batt; conforming to the following:
   1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E 84.
   2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
   3. Combustibility: Non-combustible, when tested in accordance with ASTM E 136.
   4. Thermal Resistance: R of as indicated on the drawings.
   5. Thickness: as indicated on the drawings inch.
   6. Facing: aluminum foil, flame spread 25 rated; one side.
   7. Batt/Blanket Insulation At Parapets Over Concrete Plank Roof Deck: Unfaced fiberglass, thickness and R-value as indicated on the drawings.
   8. Manufacturers:
      a. CertainTeed Corporation: www.certainteed.com.
      b. Johns Manville Corporation: www.jm.com.
      c. Owens Corning Corp: www.owenscorning.com.
   9. Substitutions: See Section 01600 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION UNDER CONCRETE SLABS

A. Place insulation under slabs on grade after base for slab has been compacted.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.03 BATT INSTALLATION

A. Install insulation and vapor retarder in accordance with manufacturer's instructions.

B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

E. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane between framing members.

F. Tape insulation batts in place.

G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

H. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over member face.

I. Tape seal tears or cuts in vapor retarder.

J. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

3.04 PROTECTION OF FINISHED WORK

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07240

EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Composite wall and soffit cladding of rigid insulation and reinforced finish coating ("Class PB").

B. Drainage and water-resistive barriers behind insulation board.

1.02 RELATED SECTIONS

A. Section 09260 - Gypsum Board Assemblies: Wall substrate construction.

B. Section 05400 - Cold Formed Metal Framing: Sheathing on metal studs.

C. Section 07260 - Vapor Retarders: Separate air barrier and vapor retarder materials.

D. Section 07620 - Sheet Metal Flashing and Trim: Perimeter flashings.

E. Section 07900 - Joint Sealers: Perimeter and penetration sealants.

1.03 REFERENCES

A. ASTM B 117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2003.

B. ASTM C 150 - Standard Specification for Portland Cement; 2005.

C. ASTM C 297/C 297M - Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions; 2004.

D. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2006.

E. ASTM C 1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster; 2006.

F. ASTM C 1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

G. ASTM C 1396 (formerly C 79) Standard Specification for Gypsum Board.

H. ASTM C 1397 - Standard Practice for Application of Class PB Exterior Insulation and Finish Systems; 2005.

I. ASTM D 968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive; 2005.

J. ASTM D 2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity; 2002.

K. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2000 (Reapproved 2005).

L. ASTM D 4060 Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser

M. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2007.

N. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials

O. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2007.

P. ASTM E 283 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen

Q. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002.

R. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000.

S. ASTM E 1677 - Standard Specification for an Air Barrier (AB) Material or System for Low-Rise Framed Building Walls; 2005.

T. ASTM E 2098 Test Method for Determining the Tensile Breaking Strength of Glass Fiber Reinforcing Mesh for use in Class PB Exterior Insulation and Finish Systems (EIFS), after Exposure to Sodium Hydroxide Solution.

U. ASTM E 2134 Test Method for Evaluating the Tensile-Adhesion Performance of Exterior Insulation and Finish Systems (EIFS)

V. ASTM E 2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies; 2003.

W. ASTM E 2485 - Standard Test Method for Freeze/Thaw Resistance of Exterior Insulation and Finish Systems (EIFS) and Water Resistive Barrier Coatings; 2006.

X. ASTM E 2486 - Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS); 2006.

Y. ASTM E 2430 Standard Specification for Expanded Polystyrene (EPS) Thermal Insulation Boards for use in Exterior Insulation and Finish Systems (EIFS)

Z. ASTM E 2485 (formerly EIMA Std. 101.01) Standard Test Method for Freeze-Thaw Resistance of Exterior Insulation and Finish Systems (EIFS) and Water-Resistive Barrier Coatings

AA. ASTM E 2486 (formerly EIMA Std. 101.86) Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS)

AB. ASTM G 153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2004.

AC. ASTM G 155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2005a.

AD. DS131, Dryvit Expanded Polystyrene Insulation Board Specification

AE. DS151, Custom Brick™ Polymer System Specifications for Use On Vertical Walls

AF. DS152, Dryvit Cleaning and Recoating

AG. DS153, Dryvit Expansion Joints and Sealants

AH. DS159, Dryvit Water Vapor Transmission

AI. DS456, Rapidry DM™ 35-50 or DS457, Rapidry DM™ 50-75 Data Sheets

AJ. DS494, Dryvit AquaFlash™ System

AK. EIMA 101.01 - Standard Test Method for Freeze/Thaw Resistance of Exterior Insulation and Finish Systems (EIFS), Class PB; 1995, Revised August 1995 (modified ASTM C 67).

AL. EIMA 101.86 - Standard Test Method for Resistance of Exterior Insulation and Finish Systems (EIFS), Class PB to the Effects of Rapid Deformation (Impact); 1995, Revised August 1995.

AM. ICC-ES AC219 - Acceptance Criteria for Exterior Insulation and Finish Systems; 2004 (Editorially revised 2006).

AN. ICC-ES AC235 - Acceptance Criteria for EIFS Clad Drainage Wall Assemblies; 2004.

AO. Mil Std E5272 Environmental Testing

AP. Mil Std 810B Environmental Test Methods

AQ. NFPA 259 - Standard Test Method for Potential Heat Building Materials; 2003.

AR. NFPA 268 - Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source; 2007.

AS. NFPA 285 - Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload Bearing Wall Assemblies Containing Components Using the Intermediate Scale Multi-Story Test Apparatus; 2006.

AT. ANSI FM 4880 Evaluating Insulated Wall or Wall and Roof/Ceiling Assemblies; Plastic Interior Finish Materials; Plastic Exterior Building Panels; Wall/Ceiling Coating Systems; Interior or Exterior Finish Systems

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate wall and soffit joint patterns, joint details, and molding profiles.

C. Product Data: Provide data on system materials.

D. Selection Samples: Submit manufacturer's standard range of samples illustrating available coating colors and textures.

E. Verification Samples: Submit actual samples of selected coating on specified substrate, minimum 12 inches square, illustrating project colors and textures.

F. Manufacturer's Installation Instructions: Indicate preparation required.

1.05 QUALITY ASSURANCE

A. Maintain copy of specified installation standard and manufacturer's installation instructions at project site at all times during installation.

B. EIFS Manufacturer Qualifications: Provide all EIFS products other than insulation from the same manufacturer with qualifications as follows:
   1. Member in good standing of EIMA (EIFS Industry Members Association).
   2. Manufacturer of EIFS products for not less than 5 years.
   3. Manufacturing facilities ISO 9002 certified.

C. Insulation Manufacturer Qualifications: Approved by manufacturer of EIFS and approved and labeled under third party quality program as required by applicable building code.

D. Installer Qualifications: Company specializing in EIFS work, with not less than 5 years of documented experience, and approved by the EIFS manufacturer.

1.06 MOCK-UP

A. Construct mock-up of typical EIFS application on specified substrate, size as required to include examples of all key conditions, and including flashings, joints, and edge conditions.

B. Locate mock-up where directed.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to project site in manufacturer's original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.

B. Storage: Protect adhesives and finish materials from freezing and temperatures in excess of 90 degrees F.
   1. Protect Portland cement based materials from moisture and humidity. Store under cover off the ground in a dry location.
   2. Protect insulation materials from exposure to sunlight.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not prepare materials or apply EIFS during inclement weather unless areas of installation are protected. Protect installed EIFS areas from inclement weather until dry.

B. Do not install finish or sealants when ambient temperature is below 40 degrees F.

C. Do not leave installed insulation board exposed to sunlight.

1.09 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's standard material warranty, covering a period of not less than 5 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Dryvit Systems, Inc.; Product OUTSULATION® PLUS SYSTEM.

B. Other Acceptable Manufacturers:
   1. ParexLahabra, Inc: www.parex.com.
   2. BASF Wall Systems/Senergy: www.senergy.cc.
   3. Sto Corp: www.stocorp.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 EXTERIOR INSULATION AND FINISH SYSTEM

A. Exterior Insulation and Finish System: Reinforced finish coating on flat-backed insulation board adhesive-applied directly to water-resistive coating over substrate; provide a complete system that has been tested to show compliance with the following characteristics; include all components of specified system and substrate(s) in tested samples.

B. Fire Characteristics:
   1. Flammability: Pass, when tested in accordance with NFPA 285.
   2. Ignitibility: No sustained flaming when tested in accordance with NFPA 268.
   3. Potential Heat of Foam Plastic Insulation Tested Independently of Assembly: No portion of the assembly having potential heat that exceeds that of the insulation sample tested for flammability (above), when tested in accordance with NFPA 259 with results expressed in Btu per square foot.

C. Adhesion of Water-Resistive Coating to Substrate: For each combination of coating and substrate, minimum flatwise tensile bond strength of 15 psi, when tested in accordance with ASTM C 297/C 297M.

D. Adhesion to Water-Resistive Coating: For each combination of insulation board and substrate, when tested in accordance with ASTM C 297/C 297M, maximum adhesive failure of 25 percent unless flatwise tensile bond strength exceeds 15 psi in all samples.

E. Water Penetration Resistance: No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes, when tested in accordance with ASTM E 331 at 6.24 psf differential pressure with tracer dye in the water spray; include in tested sample at least two vertical joints and one horizontal joint of same type to be used in construction; disassemble sample if necessary to determine extent of water penetration.

F. Salt Spray Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 300 hours exposure in accordance with ASTM B 117, using at least three samples matching intended assembly, at least 4 by 6 inches in size.

G. Freeze-Thaw Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 60 cycles, when tested in accordance with EIMA 101.01.

H. Weathering Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 2000 hours of accelerated weathering conducted in accordance with ASTM G 153 Cycle 1 or ASTM G 155 Cycle 1, 5, or 9.

I. Water Degradation Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 14 days exposure, when tested in accordance with ASTM D 2247.

J. Mildew Resistance: No growth supported on finish coating during 28 day exposure period, when tested in accordance with ASTM D 3273.

K. Abrasion Resistance Of Finish: No cracking, checking or loss of film integrity when tested in accordance with ASTM D 968 with 500 liters of sand.

L. Impact Resistance: Construct system to provide the following impact resistance without exposure of broken reinforcing mesh, when tested in accordance with EIMA 101.86 or ASTM E 2486:
   1. Standard: 25 to 49 in-lb, for areas not indicated as requiring higher impact resistance.
   2. High: 90 to 150 in-lb, for areas indicated on the drawings.

2.03 MATERIALS

A. Finish Coating Top Coat: Water-based, air curing, acrylic or polymer-based finish with integral color and texture.
   1. Texture: As indicated on drawings.
   2. Color: As indicated on drawings.

B. Base Coat: Fiber-reinforced, acrylic or polymer-based product compatible with insulation board and reinforcing mesh.

C. Reinforcing Mesh: Balanced, open weave glass fiber fabric, treated for compatibility and improved bond with coating, weight, strength, and number of layers as required to meet required system impact rating.

D. Insulation Board: Molded, expanded polystyrene board; ASTM C 578, Type I; with the following characteristics:
   1. Board Size: 24 by 48 inches.
   2. Board Size Tolerance: plus/minus 1/16 inch from square and dimension.
   3. Board Thickness: As indicated on drawings.
   4. Thickness Tolerance: plus/minus 1/16 inch maximum.
   5. Board Edges: Square.
   6. Thermal Resistance (R factor per 1 in (25.4 mm)) at 75 degrees F: 3.60.
   7. Board Density: 0.9 lb/cu ft.

8. Compressive Resistance: 10 psi.
9. Flame Spread Index: 25 or less, when tested in accordance with ASTM E 84.
10. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
11. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/400, when tested in accordance with ASTM E 84.

E. Water-Resistive Barrier: Fluid-applied coating forming air and water barrier membrane; applied to sheathing; furnished or approved by EIFS manufacturer.

F. Flashing Tape: Self-adhering rubberized asphalt tape with polyethylene backing or other material furnished or approved by EIFS manufacturer.

2.04 ACCESSORY MATERIALS

A. Insulation Adhesive: Type recommended by EIFS manufacturer for project substrate.

B. Metal Flashings: As specified in Section 07620.

C. Trim: EIFS manufacturer's standard PVC or galvanized steel trim accessories, as required for a complete project and including starter track, and drainage accessories.

D. Sealant Materials: Spectrem 4-TS silicone sealant as manufactured by Temco.

PART 3 EXECUTION

3.01 GENERAL

A. Install in accordance with EIFS manufacturer's instructions and ASTM C 1397.

B. Where different requirements appear in either document, comply with the most stringent.

C. Neither of these documents supercedes the provisions of the Contract Documents that define the contractual relationships between the parties or the scope of work.

3.02 EXAMINATION

A. Verify that substrate is sound and free of oil, loose materials, or protrusions that could interfere with EIFS installation and is of a type and construction that is acceptable to EIFS manufacturer. Do not begin work until substrate and adjacent materials are complete and thoroughly dry.

B. Verify that substrate surface is flat, with no deviation greater than 1/4 in when tested with a 10 ft straightedge.

3.03 PREPARATION

A. Install self-furring metal lath over solid substrates that are deemed unacceptable to receive adhesively applied insulation. Install in accordance with ASTM C 1063, except for butt-lapping instead of overlapping..
1. Attach to concrete and concrete masonry using corrosion-resistant power or powder actuated fasteners, or hardened concrete stub nails not less than 3/4 inch long and with heads not less than 3/8 inch wide. Ensure that fasteners are securely attached to substrate and spaced at maximum 16 inches on center horizontally and 7 inches vertically.

B. Apply primer to substrate as recommended by EIFS manufacturer for project conditions.

3.04 INSTALLATION - WATER-RESISTIVE BARRIER

A. Apply barrier coating as recommended by coating manufacturer; prime substrate as required before application.

B. Seal all substrate transitions and intersections with other materials with flashing tape, to form continuous water-resistive barrier on exterior of sheathing.

C. At door and window openings, apply flashing tape to seal water-resistive barrier to rough opening structure before installation of metal flashings, sills, or frames.

D. At moving expansion joints, apply flashing tape across and recessed into joint with U-loop forming continuous barrier but allowing movement.

E. Lap flashing tape at least 2 inches on each side of joint or transition.

3.05 INSTALLATION - INSULATION

A. Install in accordance with manufacturer's instructions.

B. Prior to installation of boards, install starter track and other trim level and plumb and securely fastened. Install only in full lengths, to minimize moisture intrusion; cut horizontal trim tight to vertical trim.

C. Install back wrap reinforcing mesh at all openings and terminations that are not to be protected with trim.

D. On wall surfaces, install boards horizontally.

E. Place boards in a method to maximize tight joints. Stagger vertical joints and interlock at corners. Butt edges and ends tight to adjacent board and to protrusions. Achieve a continuous flush insulation surface, with no gaps in excess of 1/16 inch.

F. Rasp irregularities off surface of installed insulation board.

G. Adhesive Attachment: Use method required by manufacturer to achieve drainage efficiency specified; do not close up drainage channels when placing insulation board.
   1. Adhesive to be installed in a continuous vertical ribbon notched trowel configuration as recommended by EIFS manufacturer.

3.06 INSTALLATION - FINISH

A. Base Coat: Apply in thickness as necessary to fully embed reinforcing mesh, wrinkle free, including back-wrap at all terminations of the EIFS. Install reinforcing fabric as recommended by EIFS manufacturer.

B. Lap reinforcing mesh edges and ends a minimum of 2-1/2 inches.
   1. Allow base coat to dry a minimum of 24 hours before next coating application.

C. At locations indicated, install second layer of reinforcing mesh embedded in second coat of base coating, tightly butting ends and edges of mesh.

D. Install expansion joints at floor lines as recommended by EIFS manufacturer.

E. Apply finish coat after base coat has dried not less than 24 hours and finish to a uniform texture and color.

F. Finish Coat Thickness: 1/16 inch.

G. Apply sealant at finish perimeter in accordance with Section 07900.

3.07 CLEANING AND PROTECTION

A. Do not permit finish surface to become soiled or damaged.

B. Remove excess and waste EIFS materials from project site.

C. Clean EIFS surfaces and work areas of foreign materials resulting from EIFS operations.

END OF SECTION

SECTION 07272

FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES:

A. Installation of fluid-applied membrane air barrier on standard building exterior grade surfaces indicated on drawings, consisting of preparation of existing and repaired exterior grade surfaces, sealing of cracks, seams, joints and application of Barriseal, a fluid-applied, modified bitumen-based, vapor impermeable membrane air barrier.

1.02 RELATED SECTIONS:

A. Section 03300 - Cast-In-Place Concrete

B. Division 4 - Masonry

C. Division 07200 – Thermal Protection

D. Section 07900 - Joint Sealers

E. Division 8 – Doors and Windows

F. Section 09260 - Gypsum Board

1.03 REFERENCES:

A. ASTM D 412 Tests for Rubber Properties in Tension.

B. ASTM E 96(B) Water Vapor Transmission of Materials.

C. ASTM D 3407 Standard Test Methods for Joint Sealants, Hot-Poured, for Concrete and Asphalt Pavements

D. ASTM E 283 Tests for Air Leakage through Exterior Assemblies.

E. ASTM E 331 Tests for Water Penetration of Exterior Assemblies.

F. ASTM E 2178 Test for Air Permeance Rating.

1.04 SYSTEM DESCRIPTION:

A. Barriseal:
   1. Product provided by this Section is a liquid applied membrane of a thickness when cured of not less than 40 mils, consisting of a water-based asphalt emulsion modified with a blend of synthetic rubbers and additives which cures to form a flexible, monolithic vapor/air barrier.

1.05 SUBMITTALS:

A. General: Submit in accordance with Section 01300.

B. Product Data: Submit manufacturer's product literature, installation instructions and standard details.

C. Subcontractor approval by manufacturer: Submit document stating manufacturer's acceptance of subcontractor as an Approved Applicator for the specified materials.

D. Warranty: Submit a sample warranty identifying the terms and conditions stated in Section 1.7.

1.06 QUALITY ASSURANCE:

A. Applicator Qualifications: Applicator shall be experienced in applying the same or similar materials and shall be specifically approved in writing by the membrane manufacturer.

B. Ordinances, and laws regarding use and application of products that contain volatile organic compounds (VOC).

C. Pre-Application Conference: Prior to beginning work, convene a conference to review conditions, installation procedures, schedules and coordination with other work.

D. Product Components: Vapor/Air components shall be sourced from one manufacturer, including sheet membrane, sealants, primers, adhesives and mastics.

1.07 WARRANTY:

A. Upon completion and acceptance of the work required by this section, the manufacturer will issue a warranty agreeing to promptly replace defective materials for a period of 5 years.

B. The Formation or presence of mold or fungi in a building is dependent upon a broad range of factors including, but not limited to, the presence of spores and nutrient sources, moisture, temperatures, climatic conditions, relative humidity, and heating/ventilating systems and their maintenance and operating capabilities. These factors are beyond the control of Carlisle and Carlisle shall not be responsible for any claims, repairs, restoration or damages relating to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins or the like in any building or in the air, land or water serving the building.

1.08 DELIVERIES, STORAGE AND HANDLING:

A. Deliver materials to project site in original, factory-sealed, unopened containers bearing manufacturer's name and label intact and legible with the following information.
   1. Name of material.
   2. Manufacturer's stock number and date of manufacture. Store materials in protected and well ventilated area. Keep emulsion from freezing and protect from extreme heat during storage

1.09 PROJECT CONDITIONS:

A. Use special handling procedures to apply if ambient temperature is less than 40ºF or to a damp, frosty or contaminated surface.

B. Temperature of emulsion must be conditioned to 50ºF to 100ºF before use and sustained at 50ºF to 100ºF during use.

C. Keep emulsion from freezing during handling and use.

D. Coordinate vapor/air barrier application with other trades. The applicator shall have sole right of access to the specified areas for the time needed to complete the installation.

E. Warn personnel against breathing of vapors and contact of material with skin or eyes. Wear applicable protective clothing and respiratory protection gear.

F. Keep flammable products away from spark or flame. Do not allow the use of spark producing equipment during application and until all vapors have dissipated. Post "NO SMOKING" signs.

G. Maintain work area in a neat and orderly condition, removing empty containers, rags, and rubbish daily from the site.

H. At locations of EIFS materials the applicator must veify with the EIFS manufacturer acceptance of this product to be used or not used as the required water-resistive coating over sheathing or other substrate where EIFS materials are to be installed.

PART 2 PRODUCTS:

2.01 MANUFACTURERS:

A. Provide Barriseal liquid-applied air/vapor barrier as manufactured by Carlisle Coatings and Waterproofing Incorporated, 900 Hensley Lane; Wylie, Texas 75098, Phone: (800) 527-7092 Fax: (972) 442-0076.

2.02 MATERIEALS:

A. Barriseal
   1. Liquid-applied air/vapor barrier: Shall be single coat application of 40 mil liquid applied rubberized asphalt, and shall meet or exceed the following requirements:
      a. Resilience: 98% ASTM D-3407
      b. Ultimate Elongation: 1300% minimum, ASTM D-412
      c. Perm Rating: 0.02 ASTM E-96
      d. Transmission: 0.01 gm/sq.ft ASTM E-96
      e. Air Permeance: Not to exceed 0.02 L/s per m2 of area @ 75 Pa (0.004 CFM per ft2 of area at 1.57 lbf/ft2), ASTM E-2178, Modified - concrete block substrate

2.03 ACCESSORY PRODUCTS:

A. Surface Primer: Shall be CCW-702 Solvent-Based Primer, CCW-714 Water-Based Primer, CCW-AWP Water-Based Primer or CCW-CAV-Grip.

B. Detail Flashing: CCW-705 TWF, PRE-KLEENED EPDM, CCW Window & Door Flashing, CCW EZ Flash W&D and/or Willflash Molded Corner Flashing

C. Reinforcement at Sheathing Joints: CCW-Barriseal and DCH Reinforcing Fabric or CCW Window & Door Flashing or CCW EZ Flash W&D

D. Mastic: Shall be CCW-704 Mastic.

E. Sealants: Shall be CCW-703 Vertical Grade Liquiseal membrane, PT-304 one component or CCW-201 two component Polyurethane Sealant.

PART 3 EXECUTION:

3.01 INSPECTION:

A. Before any barrier application is started the applicator shall thoroughly examine all surfaces for any deficiencies. Should any deficiencies exist, the architect, owner, or general contractor shall be notified in writing and corrections made.

B. Condition of Gypsum Based Sheathing Surfaces:
   1. The sheathing surfaces shall be of sound structural grade and shall have a smooth finish, free of voids, ridges, fins or entrained air holes.
   2. Sheathing shall be fastened with non-corroding screws, twist shank nails or be approved by the Carlisle representative.
   3. Sheathing shall be butted flush with adjoining panels.
   4. Irregularities shall be sanded or filled as required to achieve flush surfaces.
   5. All adjacent metal flashing shall be galvanized or non-ferrous metal, tight screwed or nailed.
   6. Surfaces at joints shall be on the same plane.

7. Condition of Concrete Block Surfaces:
    a. Concrete Block surfaces shall be of sound structural grade and shall have a smooth finish, free of holes, cracks, or other defects.
    b. All motor joints should be struck flush.
    c. Adjoining beams, and other substrates should be butted flush with concrete blocks.
    d. Irregularities shall be ground or filled as required to achieve flush surfaces.
    e. All adjacent metal flashing shall be galvanized or non-ferrous metal, tight screwed or nailed.
    f. Surfaces at joints shall be on the same plane.

3.02 SURFACE PREPARATION:

A. The wall surface must be thoroughly clean, dry and free from any surface contaminates or cleaning residue that may harmfully affect the adhesion of the membrane.

B. All cracks over 1/16" in width should be filled with material compatible to the substrate. Most masonry and wood applications can be filled with exterior grade urethane caulking.

C. All crack filler compound to thoroughly cure prior to proceeding.

D. Trim or detail all door, window, and penetrations using Carlisle's standard details.

E. Brick ledge flashing should be in-place prior to application of Vapor/Air Barrier.

3.03 APPLICATION:

A. Clean surfaces to remove residual dust or soil.
    1. Detail – Joints and seams with either a 30 mil coat of Barriseal containing DCH reinforcing fabric, or apply a strip of CCW EZ Flash W&D on a primed surface, or apply a strip of CCW Window & Door Flashing on a primed surface.
    2. Apply Barriseal from base of wall working up to allow water to drain over the applied area. Install at 31 sq ft per gallon
    3. Terminations: Apply the Barriseal on to the edge of brick ledge flashing, door and detail flashing. Tie Barriseal to the roof vapor/air barrier so that the juncture is air tight, durable and continuous
    4. Protection: Fluid-applied air barrier membranes are not designed for permanent exposure and should be covered as soon as construction scheduling allows.

END OF SECTION

SECTION 07410

METAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured metal panels for walls, with insulation, related flashings, and accessory components.

1.02 RELATED SECTIONS

A. Section 07212 - Board and Batt Insulation.

B. Section 07260 - Weather Barriers: Weather barrier under wall panels.

C. Section 07900 - Joint Sealers.

1.03 REFERENCES

A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2006.

B. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2006.

C. ASTM C481-94a - Laboratory Aging of Sandwich Constructions.

D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2007.

E. ASTM E283-91 - Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors

F. ASTM E289-99 - Linear Thermal Expansion of Rigid Solids with Interferometry

G. ASTM E330-97e1 - Structural Performance of Exterior Windows, Curtain Walls, and Doors

H. ASTM E331-00 - Water Penetration for Exterior Windows, Curtain Walls, and Doors

I. ASTM D1781-76 - Climbing Drum Peel for Adhesives

J. ASTM E380 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

K. ASTM E381-01 Macro etch Testing Steel Bars, Billets, Blooms, and Forgings

L. AAMA 605.2-92 - Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.

M. AAMA TIR-a11-96 - Maximum Allowable Deflection of Framing Systems for Building Cladding Components at Design Wind Loads.

1.04 DESIGN REQUIREMENTS

A. Components: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall. Design pressure of 15 lb/sq ft.

B. Maximum Allowable Deflection of Panel: 1/90 of span.

C. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.

D. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.

E. Products: Provide continuity of thermal barrier at building enclosure elements.

F. Provide continuity of air barrier and vapor retarder seal at building enclosure elements in conjunction with materials specified in Section 07260.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate dimensions, layout, joints, construction details, methods of anchorage.

C. Samples: Submit two samples of wall panel, 12 inch by 12 inch in size illustrating finish color, sheen, and texture.

1.06 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer: Company specializing in performing the work of this section with minimum 3 years of experience.

1.07 MOCK-UP

A. Construct mock-up, 4 feet long by 4 feet wide, which includes panel system, glazing, attachments to building frame, associated vapor retarder and air seal materials, weep drainage system, sealants and seals, related insulation.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND PROTECTION

A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.

B. Store prefinished material off ground and protected from weather. Prevent twisting, bending, or abrasion, and provide ventilation to stored materials. Slope metal sheets to ensure drainage.

C. Prevent contact with materials that may cause discoloration or staining of products.

1.09 PROJECT CONDITIONS

A. Coordinate the Work for installation of vapor retarder and air barrier seals.

B. Coordinate the Work with installation of window and louver components or materials.

1.10 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a 10 year period after Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.

C. Correct defective Work within a 10 year period after Substantial Completion, including defects in water tightness and integrity of seals.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Laminators Inc; Product Thermolite™ Aluminum Composite Architectural Insulated Panels.
   1. Contact: 3255 Penn Street, Hatfield PA 19440; Telephone: (215) 723-8107, Fax: (215) 721-1239

B. Other Acceptable Manufacturers:
   1. MBCI: www.mbci.com.
   2. Petersen Aluminum Corporation: www.pac-clad.com.
   3. Substitutions: See Section 01600 - Product Requirements.

2.02 MANUFACTURED METAL PANELS

A. Wall Panel System: Preformed and prefinished metal panel system of vertical profile; site assembled.

B. Exterior Panel:
   1. 0.032 inch thick precoated aluminum sheet.
   2. Color: to match PTAC louvers.

C. Liner Panel:
   1. 0.032 inch thick precoated aluminum sheet.
   2. Color: to match PTAC interior finish.

D. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

E. Anchors: Galvanized steel.

2.03 MATERIALS

A. Precoated Aluminum Sheet: ASTM B 209 (ASTM B 209M), 3105 alloy, O temper, smooth surface texture; continuous-coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.

B. Exterior Finish Coating: Panel manufacturer's standard polyvinylidene fluoride (PVF) top coat, over epoxy primer.

C. Interior Finish Coating: Panel manufacturer's standard polyester top coat, over recommended primer.

D. Panel Back Coating: Panel manufacturer's standard polyester wash coat.

E. Insulation: Polystyrene, extruded; flame spread/smoke developed index of 25 / 50, when tested in accordance with ASTM E84; 1 inch thick with a R-Value: 6.3 hr, ft2, F°/BTU.

2.04 ACCESSORIES

A. Manufacturer's Accessories: Provide manufacturer's accessories for product installation.

B. Sealants: Specified in Section 07900. Manufacturer's standard type suitable for use with installation of system; non-staining; color as selected.

2.05 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest practicable lengths.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that framing members are ready to receive panels.

B. Verify that weather barrier has been installed over substrate completely and correctly.

3.02 INSTALLATION

A. Install panels in window frame systems in accordance with manufacturer's instructions.

B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.

C. Fasten panels to structural supports; aligned, level, and plumb.

D. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.03 CLEANING

A. Remove site cuttings from finish surfaces.

B. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

END OF SECTION

SECTION 07411

PREFORMED METAL ROOF PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Architectural roofing system of preformed aluminum panels.

B. Fastening system.

C. Factory finishing.

D. Accessories and miscellaneous components.

1.02 RELATED SECTIONS

A. Section 05400 - Cold-Formed Metal Framing

B. Section 06100 - Rough Carpentry: Roof sheathing.

C. Section 07900 - Joint Sealers: Field-installed sealants.

1.03 REFERENCES

A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2006.

B. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2006.

C. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2006.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Storage and handling requirements and recommendations.
   2. Installation methods.
   3. Specimen warranty.

C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
   1. Show work to be field-fabricated or field-assembled.

D. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each roofing system specified, submit samples of minimum size 12 inches square, representing actual roofing metal, thickness, profile, color, and texture.

F. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in the manufacture of roofing systems similar to those required for this project, with not less than 5 years of experience.

B. Installer Qualifications: Company trained and authorized by roofing system manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Provide strippable plastic protection on prefinished roofing panels for removal after installation.

B. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

1.07 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 5 year period from date of Substantial Completion.

C. Waterproofing Warranty: Provide manufacturer's warranty for weathertightness of roofing system, including agreement to repair or replace roofing that fails to keep out water within specified warranty period of 5 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturers are:
   1. Architectural Building Components: www.archmetalroof.com.
   2. ATAS International, Inc: www.atas.com.
   3. Petersen Aluminum Corporation: www.pac-clad.com.

B. Substitutions: See Section 01600 - Product Requirements.

2.02 ARCHITECTURAL ROOF PANELS

A. Performance Requirements: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.

B. Metal Roofing: Factory-formed panels with factory-applied finish.
   1. Aluminum Panels:
      a. Alloy: Aluminum conforming to ASTM B 209/B 209M; temper as required for forming.
      b. Thickness: Minimum 0.32 inch.
   2. Profile: Standing seam, with minimum 1.0 inch seam height; concealed fastener system for field seaming with special tool.
   3. Texture: Smooth.
   4. Width: Maximum panel coverage of 18 inches.

2.03 ATTACHMENT SYSTEM

A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

2.04 PANEL FINISH

A. Fluoropolymer Coating System: Manufacturer's standard multi-coat thermocured coating system, including minimum 70 percent fluoropolymer color topcoat with minimum total dry film thickness of 0.9 mil; color and gloss as scheduled.

2.05 ACCESSORIES AND MISCELLANEOUS ITEMS

A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.

B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish, closed-cell synthetic rubber, neoprene, or PVC, or combination steel and closed-cell foam.

C. Sealants: As specified in Section 07900.
   1. Exposed sealant must cure to rubber-like consistency.
   2. Concealed sealant must be non-hardening type.

D. Underlayment for Wood Substrate: ASTM D 226 roofing felt, perforated type; covered by water-resistant rosin-sized building paper.

2.06 FABRICATION

A. Panels: Fabricate and finish panels and accessory items at factory, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Broom clean wood sheathing prior to installation of roofing system.

B. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.

C. Remove protective film from surface of roof panels immediately prior to installation. Strip film carefully, to avoid damage to prefinished surfaces.

D. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.

E. Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.03 INSTALLATION

A. Overall: Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
   1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
   2. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.

B. Accessories: Install all components required for a complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.

C. Underlayment: Install roofing felt and building paper slip sheet on roof deck before installing preformed metal roof panels. Secure by methods acceptable to roof panel manufacturer, minimizing use of metal fasteners. Apply from eaves to ridge in shingle fashion, overlapping horizontal joints a minimum of 2 inches and side and end laps a minimum of 3 inches. Offset seams in building paper and seams in roofing felt.

D. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.

3.04 CLEANING AND PROTECTION

A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

B. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.

C. Touch-up, repair, or replace damaged roof panels or accessories before date of Substantial Completion.

END OF SECTION

SECTION 07530

ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Elastomeric roofing membrane, mechanically fastened conventional and adhered conventional application.

B. Insulation, tapered.

C. Vapor retarder.

D. Deck sheathing.

E. Flashings.

F. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.

1.02 RELATED SECTIONS

A. Section 06114 - Wood Blocking and Curbing: Wood nailers and curbs.

B. Section 07620 - Sheet Metal Flashing and Trim: Counterflashings, reglets,.

C. Section 07710 - Manufactured Roof Specialties: Counterflashings.

D. Section 07724 - Roof Hatches and Vents: Counterflashings.

E. Section 08630 - Metal-Framed Skylights: Skylight frame, integral curb, and counterflashing.

F. Section 15146 - Plumbing Specialties: Roof drains.

1.03 REFERENCES

A. ASTM C 1177/C 1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2006.

B. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2006.

C. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension; 2006a.

D. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000.

E. ASTM D 4637 - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2004.

F. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials; 2005.

G. FM DS 1-28 - Design Wind Loads; Factory Mutual Research Corporation; 2005.

H. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.

I. UL (RMSD) - Roofing Materials and Systems Directory; Underwriters Laboratories Inc.; current edition.

J. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, and surfacing.

C. Samples for Verification: Submit two samples 12x12 inches in size illustrating insulation.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years experience and approved by manufacturer.

1.06 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

B. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

B. Store products in weather protected environment, clear of ground and moisture.

C. Protect foam insulation from direct exposure to sunlight.

1.08 PROJECT CONDITIONS

A. Coordinate the work with installation of associated counterflashings installed by other sections as the work of this section proceeds.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 95 degrees F.

C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

1.10 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a two year period after Date of Substantial Completion.

C. Provide 20 year manufacturer's material and labor warranty to cover failure to prevent penetration of water.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. EPDM Membrane Materials:
   1. Carlisle SynTec Incorporated: www.carlisle-syntec.com.
   2. Firestone Building Products Co: www.firestonebpco.com.
   3. GenFlex Roofing Systems: www.genflex.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Insulation:
   1. Atlas Roofing Corporation: www.atlasroofing.com.
   2. GAF Materials Corporation: www.gaf.com.
   3. Dow Chemical Co: www.dow.com.
   4. Owens Corning Corp: www.owenscorning.com.
   5. Substitutions: See Section 01600 - Product Requirements.

2.02 ROOFING - UNBALLASTED APPLICATIONS

A. Elastomeric Membrane Roofing: One ply membrane, fully adhered, over vapor retarder and insulation.

B. Roofing Assembly Requirements:
   1. Roof-Ceiling Fire Resistance Rating: Conform to UL Assembly Design No. see drawings.
   2. Roof Covering External Fire-Resistance Classification: UL Class A.
   3. Factory Mutual Classification: Class I and windstorm resistance of I-90, in accordance with FM DS 1-28.
   4. Insulation Thermal Value (R), minimum: see drawings; provide insulation of thickness required.

C. Acceptable Insulation Types - Tapered Application: Any type that meets requirements and is approved by membrane manufacturer for application.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); non-reinforced; complying with minimum properties of ASTM D 4637.
   1. Thickness:.060 inch.
   2. Color: Black.
   3. Tensile Strength: 1300 psi, measured in accordance with ASTM D 412.
   4. Ultimate Elongation: 300 percent, measured in accordance with ASTM D412.
   5. Tear Strength: 150 lbf/in, measured in accordance with ASTM D 624.
   6. Water Vapor Permeability: 2.0 perm inch, measured in accordance with ASTM E 96/E 96M.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Vapor Retarder: Reinforced Kraft paper laminate complying with requirements of fire rating classification; compatible with roofing and insulation materials.
   1. Fire-retardant adhesive.

D. Flexible Flashing Material: EPDM sheet; conforming to the following:
   1. Thickness: 45 mil.
   2. Tensile Strength: 1,200 psi.
   3. Color: Black.

2.04 DECK SHEATHING

A. Deck Sheathing: Glass mat faced gypsum panels, ASTM C 1177/C 1177M, fire resistant type, 1/4 inch thick.

2.05 INSULATION

A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C 1289, Type I, aluminum foil both faces; Class 1, non-reinforced foam core and with the following characteristics:
   1. Board Size: 48 x 96 inch.
   2. Board Thickness: 1-1/2 inch.
   3. Thermal Resistance: R-value of 19.
   4. Board Edges: Square.
   5. Manufacturers:
      a. Atlas Roofing Corporation: www.atlasroofing.com.
      b. Dow Chemical Co: www.dow.com.
      c. GAF Materials Corporation: www.gaf.com.
   6. Substitutions: See Section 01600 - Product Requirements.

2.06 ACCESSORIES

A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

B. Sheathing Joint Tape: Paper type, 4 inch wide, self adhering.

C. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches wide; self adhering.

D. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.

E. Membrane Adhesive: As recommended by membrane manufacturer.

F. Insulation Adhesive: As recommended by insulation manufacturer.

G. Walkway Protection: Sure-Seal Walkway Rolls as manufactured by Carlisle or acceptable alternate, 30"x30' per roll. Required at areas likely to sustain foot traffic or areas adjacent to roof hatches or access doors see Roof Plan for locations. Pads shall be 30" square and spaced apart from each other with a 4" gap between each pad.

H. Lava Boxes: Around perimeter of food preparation and dishwash exhaust fans' vertical curbs.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.02 CONCRETE DECK PREPARATION

A. Verify adjacent precast concrete roof members do not vary more than 1/4 inch in height. Verify grout keys are filled flush.

B. Fill surface honeycomb and variations with latex filler.

C. Confirm dry deck by moisture meter with 12 percent moisture maximum.

3.03 METAL DECK PREPARATION

A. Install deck sheathing on metal deck:
   1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
   2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
   3. Tape joints.

B. Mechanically fasten sheathing to roof deck, in accordance with Factory Mutual recommendations.
   1. Over entire roof area, fasten sheathing using 6 fasteners with washers per sheathing board.
   2. At roof perimeter to a distance of 4 ft in from edges, fasten sheathing using 6 fasteners with washers per board.

3.04 VAPOR RETARDER AND INSULATION - UNDER MEMBRANE

A. Apply vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
   1. Extend vapor retarder under cant strips and blocking to deck edge.
   2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.

B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.

C. Attachment of Insulation: Mechanically fasten insulation to deck in accordance with roofing manufacturer's instructions and Factory Mutual requirements.

D. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.

E. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

F. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.

G. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

H. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.

I. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches.

J. Do not apply more insulation than can be covered with membrane in same day.

3.05 MEMBRANE APPLICATION

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Fully Adhered Application: Apply adhesive to substrate at rate specified on the container label. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.

D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

E. At intersections with vertical surfaces:
   1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
   2. Fully adhere flexible flashing over membrane and up to nailing strips.
   3. Secure flashing to nailing strips at 4 inches on center.

F. Around roof penetrations, seal flanges and flashings with flexible flashing.

G. Coordinate installation of roof drains and sumps and related flashings.

3.06 LAVA BOXES

A. Construct lava boxes covering area two feet (2') beyond the face of the food preparation and dishwash exhaust fans' vertical curbs. Set lava boxes over additional layer of roof membrane material, with the additional layer adhered to the roof membrane. Fill boxes with lava stone.

3.07 FIELD QUALITY CONTROL

A. See Section 01400 - Quality Requirements, for general requirements for field quality control and inspection.

B. Require site attendance of roofing and insulation material manufacturers daily during installation of the Work.

3.08 CLEANING

A. Remove bituminous markings from finished surfaces.

B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or damaged finishes caused by work of this section.

3.09 PROTECTION OF FINISHED WORK

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07620

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, and other items indicated in Schedule when these items do not pertain to Section 07411 Preformed Metal Roof Panels complete system requirements.

B. Reglets and accessories.

C. Precast concrete splash pads.

1.02 RELATED SECTIONS

A. Section 04810 - Unit Masonry Assemblies: Through-wall flashings in masonry.

B. Section 06114 - Wood Blocking and Curbing: Wood blocking and battens for metal roofing substrate profiles.

C. Section 07530 - Elastomeric Membrane Roofing: Where membrane Roofing is indicated on the drawings.

D. Section 07710 - Manufactured Roof Specialties: Preformed flashings and manufactured expansion joint covers.

E. Section 07720 - Roof Accessories: Roof-mounted units.

F. Section 07710 - Manufactured Roof Specialties: Copings.

G. Section 07900 - Joint Sealers.

1.03 REFERENCES

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2005.

B. ASTM B 32 - Standard Specification for Solder Metal; 2004.

C. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2006.

D. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2006.

E. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2000 (Reapproved 2006).

F. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2003.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 3 years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials which may cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Pre-Finished Aluminum: ASTM B 209 (ASTM B 209M); 0.032 inch thick unless otherwise indicated; plain finish shop pre coated with fluoropolymer coating of color as selected.
   1. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system; color as scheduled.
   2. Copings/parapet caps and fascia/gravel guards shall be constructed from .050" thick material.

2.02 ACCESSORIES

A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers.
   1. Copings/parapet caps and fascia/gravel guards shall have concealed clips. Exposed fasteners are not allowed. These items are to have a snap-lock installation technique.

B. Primer: Zinc chromate type.

C. Protective Backing Paint: Zinc molybdate alkyd.

D. Sealant: Type B1 specified in Section 07900.

E. Plastic Cement: ASTM D 4586, Type I.

F. Solder: ASTM B 32; Sn50 (50/50) type.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of same material as sheet, minimum 3 inches wide, interlocking with sheet.

C. Form pieces in longest possible lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

E. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

G. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

2.04 GUTTER AND DOWNSPOUT FABRICATION

A. Gutters: Profile as indicated.

B. Downspouts: Profile as indicated.

C. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 5 years in accordance with SMACNA Architectural Sheet Metal Manual.

D. Accessories: Profiled to suit gutters and downspouts.
   1. Anchorage Devices: In accordance with SMACNA requirements.
   2. Gutter Supports: Brackets.
   3. Downspout Supports: Brackets.

E. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.

F. Downspout Boots: Plastic.

G. Seal metal joints.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

A. Conform to drawing details:
   1. Counter Flashings: SMACNA Architectural Sheet Metal Manual, Detail 4-4C.
   2. Roof Penetration Flashing: SMACNA Architectural Sheet Metal Manual, Detail 4-14B.

B. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.

C. Apply plastic cement compound between metal flashings and felt flashings.

D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

F. Secure gutters and downspouts in place using concealed fasteners.

G. Slope gutters 1/4 inch per foot minimum.

H. Connect downspouts to downspout boots. Seal connection watertight.

I. Set splash pads under downspouts. Set in place with _____.

3.04 FIELD QUALITY CONTROL

A. See Section 01400 - Quality Requirements, for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

3.05 SCHEDULE

A. Gutters and Downspouts:

B. Scuppers:

C. Coping, Cap, Parapet, Sill and Ledge Flashings:

D. Flashings Associated with Shingle Roofing, including Valley, Hip, Ridge, Eave, Gutter Edge, Gable Edge, Chimney:

E. Sheet Metal Roof Expansion Joint Covers, and Roof-to-Wall Joint Covers:

F. Counterflashings at Roofing Terminations (over roofing base flashings): Stainless steel.

G. Counterflashings at Curb-Mounted Roof Items:

H. Roofing Penetration Flashings, for Pipes, Structural Steel, and Equipment Supports: Lead sheet.

END OF SECTION

SECTION 07710

MANUFACTURED ROOF SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured roof specialties, including copings, fascias, gravel stops, and vents.

1.02 RELATED SECTIONS

A. Section 07720 - Roof Accessories: Manufactured curbs, roof hatches, and snow guards.

B. Section 07900 - Joint Sealers.

1.03 REFERENCES

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2005.

B. ASTM D 2822 - Standard Specification for Asphalt Roof Cement, Asbestos-Containing; 2005.

C. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.

D. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2003.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.

C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.

D. Samples: Submit two appropriately sized samples of coping and gravel stop.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual details.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Copings and Gravel Guards:
   1. Architectural Products Co: www.archprod.com.
   2. W.P. Hickman Co: www.wph.com.
   3. MM Systems Corp: www.mmsystemscorp.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Louvered Vents:
   1. CopperCraft: www.coppercraft.com.
   2. Vulcan Supply Corp: www.vulcansupply.com.
   3. Substitutions: See Section 01600 - Product Requirements.

C. Roof Louver/Vents:
   1. AIR VENT INC; Ph: 800-AIR-VENT; Product: Slant-Back Metal Roof Vent

2.02 COMPONENTS

A. Copings: Extruded aluminum,.050 inch thick, shaped as indicated, including special supports spaced at 96 inches on center. Include cover plates to conceal and weather seal joints and attachment flanges.
   1. Finish: Fluoropolymer coating (High Performance).
   2. Color: As selected.
   3. Fasteners: Copings/parapet caps and fascia/gravel guards shall have concealed clips. Exposed fasteners are not allowed. These items are to have a snap-lock installation technique.

B. Roof Louver/Vents: For venting of Parapet void areas as indicated on the Construction Drawings.
   1. Fabrication: heavy-duty aluminum construction, screened, large flange, 50-sq in. of net free area per vent, for 3:12 to 12:12 pitch roofs.
   2. Color: Black

2.03 ACCESSORIES

A. Sealant: Type B1 as specified in Section 07900.

B. Roofing Cement: ASTM D 2822, Type I, cutback asphalt type.

2.04 FINISHES

A. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system; color as scheduled.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.02 INSTALLATION

A. Install components in accordance with manufacturer's instructions.

B. Coordinate installation of components of this section with installation of roofing membrane and base flashings.

C. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.

D. Coordinate installation of flashing flanges into reglets.

END OF SECTION

SECTION 07720

ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured curbs, equipment rails, and pedestals.

B. Roof hatches, manual and automatic operation, including smoke vents.

1.02 RELATED SECTIONS

A. Section 05310 - Steel Deck.

1.03 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; 2006a.

B. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2006a.

C. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.

D. UL (BMD) - Building Materials Directory; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. 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.
   4. Maintenance requirements.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products under cover and elevated above grade.

PART 2 PRODUCTS

2.01 MANUFACTURED CURBS

A. Manufactured Curbs, Equipment Rails, and Other Roof Mounting Assemblies:
   1. AES Manufacturing Inc.: www.aescurb.com.
   2. The Pate Company: www.patecurbs.com.
   3. RPS Accessories: www.rpscurbs.com.

B. Manufactured Curbs, Equipment Rails, and Other Roof Mounting Assemblies: Factory-assembled hollow sheet metal construction with fully mitered and welded corners, integral counterflashing, internal reinforcing, and top side and edges formed to shed water.
   1. Sheet Metal: Hot-dip aluminum zinc alloy coated steel sheet (Galvalume) complying with ASTM A 792/A 792M; AZ60 coating designation; 18 gage, 0.048 inch thick.
   2. Manufacture curb bottom and mounting flanges for installation directly on roof deck, not on insulation; match slope and configuration of roof deck.
   3. Provide the layouts and configurations shown on the drawings.

2.02 ROOF HATCHES, MANUAL AND AUTOMATIC OPERATION

A. Manufacturers - Roof Hatches:
   1. Bilco Co: www.bilco.com.
   2. Dur-Red Products: www.dur-red.com.
   3. Milcor Inc: www.milcorinc.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Roof Hatches: Factory-assembled aluminum frame and cover, complete with operating and release hardware.
   1. Style: Provide flat metal covers unless otherwise indicated.
   2. Mounting: Provide frames and curbs suitable for mounting on flat roof deck.
   3. Size(s): As indicated on drawings; single-leaf style unless indicated as double-leaf.
   4. For Ladder Access: Single leaf; 36 by 36 inches.

C. Frames/Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
   1. Material: Mill finished aluminum, 11 gage, 0.125 inch thick.
   2. Insulation: 1 inch rigid glass fiber, located on inside hollow curb.
   3. Curb Height: 12 inches from finished surface of roof, minimum.

D. Metal Covers: Flush, insulated, hollow metal construction.
   1. Capable of supporting 40 psf live load.
   2. Material: Mill finished aluminum; outer cover 0.125 inch thick, liner 0.04 inch thick.
   3. Insulation: 1 inch rigid glass fiber.
   4. Gasket: Neoprene, continuous around cover perimeter.

E. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.
   1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf load.
   2. Hinges: Heavy duty pintle type.
   3. Hold open arm with vinyl-coated handle for manual release.
   4. Latch: Upon closing, engage latch automatically and reset manual release.
   5. Manual Release: Pull handle on interior.
   6. Locking: Padlock hasp on interior.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing weather integrity.

3.04 CLEANING AND PROTECTION

A. Clean installed work to like-new condition.

B. Protect installed products until completion of project.

C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07815

SPRAYED-ON FIREPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fireproofing of interior structural steel.

1.02 RELATED SECTIONS

A. Section 05120 - Structural Steel.

B. Section 05210 - Steel Joists.

C. Section 05310 - Steel Deck.

D. Section 07840 - Firestopping.

E. Section 09260 - Gypsum Board Assemblies: Gypsum board fireproofing.

1.03 REFERENCES

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2007.

B. ASTM E 605 - Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 1993 (Reapproved 2006).

C. ASTM E 736 - Standard Test Method For Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members; 2000 (Reapproved 2006).

D. ASTM E 760 - Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2005).

E. ASTM E 761 - Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2005).

F. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 PERFORMANCE REQUIREMENTS

A. Sprayed-On Fireproofing Systems: Provide UL fire-rated assemblies to hourly ratings as indicated on the drawings.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittals procedures.

B. Product Data: Provide data indicating product characteristics.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

D. Manufacturer's Certificate: Certify that sprayed-on fireproofing products meet or exceed requirements of contract documents.

E. Manufacturer's Field Reports: Indicate environmental conditions under which fireproofing materials were installed.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section, with minimum 3 years of experience.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire resistance ratings.

B. Provide certificate of compliance for fireproofing materials to authority having jurisdiction, indicating approval for use on this project.

1.08 MOCK-UP

A. Construct mock-up, 100 sq ft (9 sq m).

B. Conform to project requirements for fire ratings.

C. Locate where directed.

D. Examine installation within one hour of application to determine variances from specified requirements due to shrinkage, temperature, and humidity.

E. Where shrinkage and cracking are evident, adjust mixture and method of application as necessary. Remove materials and re-construct mock-up.

F. Mock-up may remain as part of the Work.

1.09 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.10 PROJECT CONDITIONS

A. Sequence work in conjunction with placement of ceiling hanger tabs, mechanical component hangers, and electrical components.

B. Do not allow roof traffic during installation of roof fireproofing and drying period.

1.11 ENVIRONMENTAL REQUIREMENTS

A. Do not apply spray fireproofing when temperature of substrate material and surrounding air is below 40 degrees F.

B. Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.

C. Provide temporary enclosure to prevent spray from contaminating air.

1.12 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.
   1. Include coverage for fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation, and blistering.
   2. Reinstall or repair failures that occur within warranty period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Sprayed-On Fireproofing:
   1. Carboline Company: www.carboline.com.
   2. Grace Construction Products: www.na.graceconstruction.com.
   3. Southwest Fireproofing Products Company: www.sfrm.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 FIREPROOFING ASSEMBLIES

A. Provide assemblies as indicated on the drawings.

2.03 MATERIALS

A. Low Density Sprayed Fire-Resistive Material: Factory mixed, cementitious material blended for uniform texture with vermiculite or lightweight synthetic aggregate, and conforming to the following requirements:
   1. Bond Strength: ASTM E 736, 200 psf when set and dry.
   2. Bond Impact: ASTM E 760, no cracking, flaking or delamination.
   3. Dry Density: ASTM E 605, minimum average density of 14 lb/cu ft, with minimum individual density of any test sample of 13 lb/cu ft.
   4. Compressive Strength: ASTM E 761, minimum 7.0 psi.
   5. Surface Burning Characteristics: Maximum flame spread of 0 and maximum smoke developed of 0, when tested in accordance with ASTM E 84.

2.04 ACCESSORIES

A. Primer Adhesive: Of type recommended by fireproofing manufacturer.

B. Metal Lath: Expanded metal lath; 3.4 lb/sq ft, galvanized finish.

C. Water: Clean, potable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive fireproofing.

B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.

C. Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.

D. Verify that voids and cracks in substrate have been filled. Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

3.02 PREPARATION

A. Perform tests as recommended by fireproofing manufacturer in situations where adhesion of fireproofing to substrate is in question.

B. Remove incompatible materials that could affect bond by scraping, brushing, scrubbing, or sandblasting.

C. Prepare substrates to receive fireproofing in strict accordance with instructions of fireproofing manufacturer.

D. Apply fireproofing manufacturer's recommended bonding agent on primed steel.

E. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.

F. Close off and seal duct work in areas where fireproofing is being applied.

3.03 APPLICATION

A. Install metal lath over structural members as indicated or as required by UL Assembly Design Numbers.

B. Apply primer adhesive in accordance with manufacturer's instructions.

C. Apply fireproofing in sufficient thickness to achieve required ratings, with as many passes as necessary to cover with monolithic blanket of uniform density and texture.

3.04 FIELD QUALITY CONTROL

A. Inspect the installed fireproofing after application and curing for integrity, prior to its concealment. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings.

B. Re-inspect the installed fireproofing for integrity of fire protection, after installation of subsequent Work.

3.05 CLEANING

A. Remove excess material, overspray, droppings, and debris.

B. Remove fireproofing from materials and surfaces not required to be fireproofed.

END OF SECTION

SECTION 07840

FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping materials.

B. Firestopping of all penetrations and interruptions to fire rated assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED SECTIONS

A. Section 07815 - Sprayed-On Fireproofing.

B. Section 09260 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.03 REFERENCES

A. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2007.

B. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2006.

C. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.

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

E. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.

C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Certificate from authority having jurisdiction indicating approval of materials used.

F. Qualification statements for installing mechanics.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section and:
   1. Approved by Factory Mutual Research under FM Standard 4991, Approval of Firestop Contractors.
   2. With minimum 3 years documented experience installing work of this type.
   3. Able to show at least 5 satisfactorily completed projects of comparable size and type.
   4. Approved by firestopping manufacturer.

C. Installing Mechanic's Qualifications: Trained by firestopping manufacturer and able to provide evidence thereof.

1.06 MOCK-UP

A. Install one firestopping assembly representative of each fire rating design required on project.
   1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.

B. Obtain approval of authority having jurisdiction before proceeding.

C. If accepted, mock-up will represent minimum standard for the Work.

D. If accepted, mock-up may remain as part of the Work. Remove and replace mock-ups not accepted.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 FIRESTOPPING ASSEMBLIES

A. Firestopping: Any material meeting requirements.
   1. Fire Ratings: See Drawings for required systems and ratings.

2.02 MATERIALS

A. Firestopping Sealants: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. Ceramic-Fiber and Mastic Coating: Ceramic fibers in bulk form formulated for use with mastic coating, and ceramic fiber matufacturers mastic coating. Subject to compliance with requirements, manufacturers offering specified items which may be incorporated in the work include the following:
   1. FireMaster Bulk and FireMaster Mastic, by Thermal Ceramics; Augusta, Georgia.
   2. Nelson FSB Bulk, by Nelson Firestop Products; Tulsa, Oklahoma.

C. Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum foil on one side. Subject to compliance with requirements, manufacturers offering specified items which may be incorporated in the work include the following:
   1. Dow Coming Fire Stop Intumescent Wrap Strip 2002, by Dow Coming Corporation; Midland, Michigan.
   2. CP643/642 Firestop Collar, by Hilti Construction Chemicals, Inc.; Tulsa, Oklahoma.
   3. Fire Barrier FS-195 Wrap/Strip, by 3M Fire Protection Products; St. Paul, Minnesota.
   4. Nelson FRS Wrapstrip, by Nelson Firestop Products; Tulsa, Oklahoma.

D. Silicone Foams: Two-component, silicone-based liquid elastomer that, when mixed, expands and cures in place to produce a flexible, non-shrinking foam. Subject to compliance with requirements, manufacturers offering specified items which may be incorporated in the work include the following:
   1. Cow Corning Firestop Sealant 2000. by Dow Corning Corp.; Midland, Michigan.
   2. Bow Corning Firestop Sealant SL 2003, by Dow Corning Corp.; Midland, Michigan.
   3. Pensil 100 Firestop Sealant, by General Electric Co.; Waterford, New York.
   4. FS-ONE Intumescent Firestop Sealant, by Hilti Construction Chemicals, Inc.; Tulsa, Oklahoma.
   5. Metacaulk 835 by the RectorSeal Corporation; Houston, Texas.

6. Fyre-Sil, by Tremco, Inc.; Beachwood, Ohio.
7. Fyre-Sil S/L, by Tremeo Inc.; Beachwood, Ohio.
8. Nelson CLK Non-Sag Sealant, by Nelson Firestop Products; Tulsa, Oklahoma.
9. Nelson CLK Self-Leveling Sealant, by Nelson Firestop Products; l'ulsa, Oklahoma.

E. Moisture-curing, single-component, silicone-based netural-curing elastomeric sealant of grade indicated below:
   1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping / gunable sealant, unless indicated firestop system limits use to nosag grade for both opening conditions.
   2. Grade for Horizontal Surfaces: Pourable (self-leveling) grade for openings in floors and other horizontal surfaces.
   3. Grade for Vertical Surfaces: Nonsag grade for openings in vertical and other surfaces.

F. Firestopping Putty: Where an outlet box is installed in a rated assembly (1 and 2 hour) with an outlet box on the opposite side within 24 inches, both boxes shall be protected with firestopping putty per the manufacturer's instructions. Only the following firestopping putty pad materials are acceptable:
   1. MPP-4S by 3M; St. Paul, Minnesota.
   2. FSP by Nelson Firestop Products; Tulsa, Oklahoma.
   3. SpecSeal by Specified Technologies; Somerville, New Jersey.
   4. CP617 Firestop Pad, by Hilti Construction Chemicals, Inc.; Tulsa. Oklahoma.

G. Mineral Fiber Safing Insulation: Provide manufacturer's standard felted semi-rigid board of nonasbestos mineral fibers plus binders, rated noncombustible (ASTM F 136), listed and labeled by UL, and listed in UL Designs similar to applications indicated.
   1. Acceptable Products/Manufactures: Thermafiber, LLC (United States Gypsum) Thermafiber Safing Insulation.
   2. Thermal: K-value at 75 F of 0.25.
   3. Thickness: 4' unless indicated otherwise, and not less than the thickness required to obtain required firerating.
   4. Fire Safing Density: Nominal 4 lb. per cubic feet.

H. Mineral Wool: Loose mineral wool, rated noncombustible (ASTM E 136), free of asbestos fiber and glass fiber, suitable for stuffing into metal deck flute openings above steel structural members, to an in-place density of 6 to 12 lbs. per cubic foot.

I. Accessories: for each application provide manufacturer's standard board-anchorage system complying with related UL Design, and as indicated.

J. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.

B. Remove incompatible materials which may affect bond.

C. Install backing materials to arrest liquid material leakage.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authority having jurisdiction.

C. Install labelling required by code.

3.04 CLEANING AND PROTECTION

A. Clean adjacent surfaces of firestopping materials.

B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07900

JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants and joint backing.

1.02 RELATED SECTIONS

A. Section 07840 - Firestopping: Firestopping sealants.

B. Section 08800 - Glazing: Glazing sealants and accessories.

C. Section 09260 - Gypsum Board Assemblies: Acoustic sealant.

1.03 REFERENCES

A. ASTM C 834 - Standard Specification for Latex Sealants; 2005.

B. ASTM C 919 - Standard Practice for Use of Sealants in Acoustical Applications; 2002.

C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2005.

D. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2005a.

E. ASTM D 1667 - Standard Specification for Flexible Cellular Materials--Poly(Vinyl Chloride) Foam (Closed-Cell); 2005.

F. BAAQMD 8-51 - Bay Area Air Quality Management District Regulation 8, Rule 51, Adhesive and Sealant Products; www.baaqmd.gov; current edition.

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

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating sealant chemical characteristics.

C. Samples: Submit two samples, 1/4 x 2 inch in size illustrating sealant colors for selection.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the work of this section with minimum two years experience.

1.06 MOCK-UP

A. Provide mock-up of sealant joints in conjunction with window under provisions of Section 01400.

B. Construct mock-up with specified sealant types and with other components noted.

C. Locate where directed.

D. Mock-up may remain as part of the Work.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.08 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.09 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Silicone Sealants:
   1. GE Plastics: www.geplastics.com.
   2. Pecora Corporation: www.pecora.com.
   3. Tremco; Product Spectrem 4-TS.
      a. This sealant although available for use at other locations shall be used exclusively with EIFS (Dryvit) locations.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Polyurethane Sealants:
   1. Pecora Corporation: www.pecora.com.
   2. BASF Construction Chemicals, Inc: www.chemrex.com.
   3. Substitutions: See Section 01600 - Product Requirements.

C. Butyl Sealants:
   1. Bostik, Inc: www.bostik-us.com.
   2. Substitutions: See Section 01600 - Product Requirements.

D. Acrylic Emulsion Latex Sealants:
   1. Pecora Corporation: www.pecora.com.
   2. BASF Construction Chemicals, Inc: www.chemrex.com.
   3. Substitutions: See Section 01600 - Product Requirements.

2.02 SEALANTS

A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. Type E1 - General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; multi- component.
   1. Color: To match adjacent surfaces.
   2. Applications: Use for:
      a. Control, expansion, and soft joints in masonry.
      b. Joints between concrete and other materials.
      c. Joints between metal frames and other materials.
      d. Other exterior joints for which no other sealant is indicated.

C. Type B1 - Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
   1. Applications: Use for:
      a. Concealed sealant bead in sheet metal work.
      b. Under thresholds.

D. Type A1 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type OP, Grade NF single component, paintable.
   1. Color: Standard colors matching finished surfaces.
   2. Applications: Use for:
      a. Interior wall and ceiling control joints.
      b. Joints between door and window frames and wall surfaces.
      c. Other interior joints for which no other type of sealant is indicated.

E. Type E2 - Bathtub/Tile Sealant: White silicone; ASTM C 920, Uses M and A; single component, mildew resistant.
   1. Applications: Use for:
      a. Joints between plumbing fixtures and floor and wall surfaces.

F. Type A2 - Acoustical Sealant: Butyl or acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
   1. Applications: Use for concealed locations only:
      a. Sealant bead between top stud runner and structure and between bottom stud track and floor.

G. Type E4 - Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Grade P, Class 25, Uses T, M and A; single component.
   1. Approved by manufacturer for wide joints up to 1-1/2 inches.
   2. Color: Colors as selected.
   3. Applications: Use for:
      a. Expansion joints in floors.

H. Type E5 - Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Class 25, Uses T, I, M and A; single component.
   1. Color: Color as selected.
   2. Applications: Use for:
      a. Joints in sidewalks and vehicular paving.

I. Type E6 - Silicone Sealant: ASTM C 920, Grade NS, Class 25, Uses NT, A, G, M, O; single component, solvent curing, non-sagging, non-staining, fungus resistant, non-bleeding.
   1. Color: Standard colors matching finished surfaces.
   2. Movement Capability: Plus and minus 25 percent.
   3. Service Temperature Range: -65 to 180 degrees F.
   4. Shore A Hardness Range: 15 to 35.
   5. Applications: Use for:
      a. Joints in aluminum storefront framing system.
      b. Joints in skylight framing system.

2.03 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.

C. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C 1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C 1193.

C. Perform acoustical sealant application work in accordance with ASTM C 919.

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

E. Install bond breaker where joint backing is not used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

H. Tool joints concave.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION OF FINISHED WORK

A. Protect sealants until cured.

END OF SECTION

SECTION 08110

STEEL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated steel doors and frames.

B. Steel frames for wood doors.

C. Fire-rated steel doors and frames.

D. Thermally insulated steel doors.

E. Steel glazing frames.

F. Accessories, including glazing, louvers, and matching panels.

1.02 RELATED SECTIONS

A. Section 08710 - Door Hardware.

B. Section 08800 - Glazing: Glass for doors and borrowed lites.

C. Section 09900 - Paints and Coatings: Field painting.

1.03 REFERENCES

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2003.

B. ANSI A250.3 - Test Procedure and Acceptance Criteria for Factory-Applied Finish Painted Steel Surfaces for Steel Doors and Frames; 1999.

C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2004).

D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2006a.

E. ASTM C 236 - Standard Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box; 1989 (Reapproved 1993).

F. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus; 2005.

G. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute; 2000 (ANSI/DHI A115 Series).

H. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 1999.

I. NAAMM HMMA 860 - Guide Specifications for Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 1992.

J. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2000.

K. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 2007.

L. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association; 2003.

M. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

N. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; 1998.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Maintain at the project site a copy of all reference standards dealing with installation.

1.06 DELIVERY, STORAGE, AND PROTECTION

A. Store in accordance with NAAMM HMMA 840.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Doors and Frames:
   1. Ceco Door Products: www.cecodoor.com.
   2. Windsor Republic Doors: www.republicdoor.com.
   3. Steelcraft: www.steelcraft.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
   1. Accessibility: Comply with ANSI/ICC A117.1.
   2. Door Top Closures: Flush with top of faces and edges.
   3. Door Edge Profile: Beveled on both edges.
   4. Door Texture: Smooth faces.
   5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
   6. Hardware Preparation: In accordance with DHI A115 Series, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
   7. Galvanizing for Units in Wet Areas: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.
   8. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL DOORS

A. Exterior Doors:
   1. Grade: NAAMM HMMA 861, physical performance Level A.
   2. Core: Polystyrene foam.
   3. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.
   4. Insulating Value: U-value of.09, when tested in accordance with ASTM C 1363 or ASTM C 236.
   5. Weatherstripping: Separate, see Section 08710.

B. Interior Doors, Non-Fire-Rated:
   1. Grade: NAAMM HMMA 860, physical performance Level A.
   2. Core: Cardboard honeycomb.
   3. Thickness: 1-3/4 inches.

C. Interior Doors, Fire-Rated:
   1. Grade: NAAMM HMMA 861, physical performance Level A.
   2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").
   3. Fire Rating: As indicated on Door and Frame Schedule, with temperature rise ratings as required by code, tested in accordance with NFPA 252.
      a. Provide units listed and labeled by UL.
      b. Attach fire rating label to each fire rated unit.
   4. Core: Mineral fiberboard.

D. Panels: Same construction, performance, and finish as doors.

2.04 STEEL FRAMES

A. General:
   1. Comply with the requirements of grade specified for corresponding door, except:
      a. Frames for Wood Doors: Comply with frame requirements specified in NAAMM HMMA 861
   2. Finish: Same as for door.
   3. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
   4. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
   5. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

B. Exterior Door Frames: Face welded, seamless with joints filled.
   1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.
   2. Weatherstripping: Separate, see Section 08710.

C. Interior Door Frames, Non-Fire-Rated: Face welded type.

D. Interior Door Frames, Fire-Rated: Face welded type.
   1. Fire Rating: Same as door, labeled.

E. Mullions for Pairs of Doors: Removable type, of profile similar to jambs.

F. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.

2.05 ACCESSORY MATERIALS

A. Louvers: Roll formed steel with overlapping frame; factory-painted finish, color as selected; factory-installed.
   1. Style: Sightproof inverted V blade.
   2. Louver Free Area: 100 percent.
   3. Fasteners: Exposed, tamper proof fasteners.

B. Glazing: As specified in Section 08800, factory installed.

C. Removable Stops: Formed sheet steel, mitered corners; prepared for countersink style tamper proof screws.

D. Astragals for Double Doors: Specified in Section 08710.
   1. Fire-Rated Doors: Steel, shape as required to accomplish fire rating.

E. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited.

F. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

G. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.06 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

B. In addition, install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

E. Coordinate installation of hardware.

F. Coordinate installation of glazing.

3.04 ERECTION TOLERANCES

A. Clearances Between Door and Frame: As specified in ANSI A250.8.

B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.06 SCHEDULE - See Drawings

END OF SECTION

SECTION 08120

ALUMINUM DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tubular aluminum doors.

B. Accessories, including louvers, fasteners, and brackets.

1.02 RELATED SECTIONS

A. Section 07900 - Joint Sealers.

B. Section 08710 - Door Hardware.

C. Section 08800 - Glazing.

1.03 REFERENCES

A. AAMA 609 - Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum; American Architectural Manufacturers Association; 2002.

B. AAMA 701/702 - Voluntary Specifications for Pile Weatherstripping and Replaceable Fenestration Weatherseals; American Architectural Manufacturers Association; 2004.

C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; American Architectural Manufacturers Association; 2005.

D. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.

E. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2006.

F. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2006.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's descriptive literature for each type of door and frame; include information on fabrication methods, finishing, hardware preparation, accessories, storage, installation, and maintenance instructions.

C. Shop Drawings: Include elevations of each opening type, details at each wall type, and schedule of openings.

D. Selection Samples: Complete set of color and finish options, using actual materials, for Architect 's selection.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Not less than 5 years of experience in manufacturing components of the types specified.

B. Installer Qualifications: Firm with documented experience in installing components of the types specified.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver aluminum components in manufacturer's standard protective packaging, palleted, crated, or banded together.

B. Inspect delivered components for damage and replace. Repaired components will not be accepted.

C. Store components under cover in manufacturer's packaging until installation.

1.07 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate on shop drawings. Coordinate fabrication with project schedule to avoid delays in the work.

B. Environmental Limitations: Do not begin installation of interior aluminum components until space has been enclosed and ambient thermal conditions are being maintained at levels consistent with final project requirements.

1.08 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Manufacturer's Product Warranty: Submit, for Owner's acceptance, manufacturer's warranty for entrance system as follows:
   1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by the manufacturer. In addition, welded door corner construction shall be supported with a limited lifetime warranty for the life of the door under normal use.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The design of the project has been based on products manufactured by Kawneer model 350.
   1. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Extruded Aluminum: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or alloy 6463-T5.

2.03 COMPONENTS

A. Tubular Aluminum Doors: Provide 1-3/4 in thick glazed doors using materials as follows:
   1. Framing: Extruded aluminum tubing, 0.125 in minimum thickness, with heavy-duty plated steel through bolts in rails.
      a. Bottom rail: Height as required by the Authority Having Jurisdiction and ADA law.
      b. Stile width: As indicated on drawings.
   2. Glazing: Clear, 1/4 in tempered glass at interior door locations.
   3. Glazing: 1 in thick insulating units at exterior door locations made up of clear, 1/4 in tempered glass.
   4. Replaceable Weatherstripping: AAMA 701/702 wool pile.

2.04 FINISHES

A. Finish: High Performance Organic Coating: Kynar/Polyvinylidene Fluoride (PVDF) complying with requirements of AAMA 2604; color as selected from manufacturer's full range by Architect.

2.05 FABRICATION

A. Door sizes shown are nominal; provide standard clearances as follows:
   1. Hinge and Lock Stiles: 0.125 inch.
   2. Between Meeting Stiles: 0.250 inch.
   3. At Top Rail and Bottom Rail: 0.125 inch.

B. Sizes and locations of lights: As indicated on drawings.

2.06 ACCESSORIES

A. Fasteners: Aluminum, non-magnetic stainless steel, or other material warranted by manufacturer as non-corrosive and compatible with aluminum components.

B. Brackets and Reinforcements: Manufacturer's high-strength aluminum units where feasible, otherwise, non-magnetic stainless steel or steel hot-dip galvanized in compliance with ASTM A 123/A 123M.

C. Aluminum entrance/exit doors shall be furnished with offset pivots, Style V push/pull, parallel arm overhead closer, Adams-Rite 8400 Series concealed exit device for use with Adams-Rite 7108 fail secure electric strike interfaced with card reader; Adams-Rite 4603 rectifier; Adams-Rite 4605 transformer; and aluminum threshold. Refer to Section 08710, Finish Hardware, for cylinder and card reader.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall surfaces and openings are ready to receive frames and are within tolerances specified in manufacturer's instructions.

B. Verify that frames installed by other trades for installation of doors of this section are in strict accordance with recommendations and approved shop drawings and within tolerances specified in manufacturer's instructions.

3.02 PREPARATION

A. Perform cutting, fitting, forming, drilling, and grinding of frames as required for project conditions.

B. Replace components with damage to exposed finishes.

C. Separate dissimilar metals to prevent electrolytic action between metals.

3.03 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and approved shop drawings.

B. Where aluminum surfaces contact metals other than stainless steel, zinc, or small areas of white bronze, protect from direct contact by painting dissimilar metal with heavy coating of bituminous paint.

C. Hang doors and adjust hardware to achieve specified clearances and proper door operation.

D. Install door hardware as specified in Section 08710.

E. Install glass in frames as specified in Section 08800.

3.04 CLEANING

A. Upon completion of installation, thoroughly clean door and frame surfaces in accordance with AAMA 609.

B. Do not use abrasive, caustic, or acid cleaning agents.

3.05 PROTECTION

A. Protect products of this section from damage caused by subsequent construction until substantial completion.

B. Replace damaged or defective components that cannot be repaired to a condition indistinguishable from undamaged components.

END OF SECTION

SECTION 08211

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration; fire rated and non-rated.

1.02 RELATED SECTIONS

A. Section 06200 - Finish Carpentry.

B. Section 08110 - Steel Doors and Frames.

C. Section 08710 - Door Hardware.

D. Section 08800 - Glazing.

E. Section 09900 - Paints and Coatings: Site finishing of doors.

1.03 REFERENCES

A. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2006, 8th Ed., Version 2.0.

B. ICC (IBC) - International Building Code; 2006.

C. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

D. LMA (VPS) - Voluntary Product Standards and Typical Physical Properties of Decorative Overlays; Composite Panel Association; 2004.

E. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.

F. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 2007.

G. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association; 2003.

H. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

I. UL 10B - Standard for Fire Tests of Door Assemblies; 1997.

J. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; 1998.

K. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; 2001.

L. WDMA I.S.1-A - Architectural Wood Flush Doors; Window and Door Manufacturers Association; 2004.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Specimen warranty.

D. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing.

E. Samples: Submit two samples of door construction, 6 x 6 inch in size cut from top corner of door.

F. Samples: Submit two samples of door veneer, 6 x 6 inch in size illustrating plastic laminate pattern and color.

G. Manufacturer's Installation Instructions: Indicate special installation instructions.

H. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.

B. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as scheduled.

1.06 DELIVERY, STORAGE, AND PROTECTION

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 PROJECT CONDITIONS

A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.08 WARRANTY

A. See Section 01780 - Closeout Submittals for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

C. Provide warranty for the following term:
   1. Interior Doors: Life of installation.

D. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 DOORS

A. All Doors:.
   1. Quality Level: Custom Grade, Heavy Duty performance, in accordance with WDMA I.S.1-A.
   2. High Pressure Decorative Laminate Faced Doors: 5-ply unless otherwise indicated.
   3. Low Pressure Decorative Laminate Faced Doors: Laminate fused directly to seamless core unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at all locations.

2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with NFPA 252, UL 10B, or UBC Standard 7-2-94 ("neutral pressure"); UL or WH (ITS) labeled without any visible seals when door is open.
3. Smoke and Draft Control Doors: In addition to required fire rating, provide door assemblies tested in accordance with UL 1784 with maximum air leakage of 3.0 cfm per sq ft of door opening at 0.10 inch w.g. pressure at both ambient and elevated temperatures; with "S" label; if necessary, provide additional gasketing or edge sealing.
4. High pressure decorative laminate finish.
5. Low pressure decorative laminate finish.

2.02 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated above.

B. Core for Low Pressure Decorative Laminate, Non-Rated and 20 Minute Rated: ANSI A208.1 Grade M-2 particleboard, minimum, with no seams on faces; edges reinforced as required to pass WDMA performance grade specified.

C. Fire Rated Doors: Mineral core, Type FD, plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.03 DOOR FACINGS

A. Wood Veneer Facing for Transparent Finish: Species as specified above, veneer grade as specified by quality standard, plain sliced, book veneer match, running assembly match; unless otherwise indicated.
1. Vertical Edges: Same species as face veneer.
2. Pairs: Pair match each pair; set match pairs within 10 feet of each other when doors are closed.

B. High Pressure Decorative Laminate Facing for Fire Doors: NEMA LD 3, SGF; color as selected; textured, low gloss finish.

C. High Pressure Decorative Laminate Facing for Non-Fire-Rated Doors: NEMA LD 3, HGS; ____ color; textured, low gloss finish.

D. Low Pressure Decorative Laminate Facing: Comply with Laminating Materials Association "Voluntary Product Standards and Typical Physical Properties of Decorative Overlays"; matching PVC edges applied with polyurethane hot melt adhesive; color and pattern as selected from manufacturer's standard selection.

E. Facing Adhesive: Type II - water resistant.

2.04 ACCESSORIES

A. Glazing Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamper proof screws.

B. Astragals for Non-Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge.

C. Astragals for Fire Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge, specifically for double doors.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with Stiles and Rails:

C. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
   1. Provide solid blocking for other throughbolted hardware.

D. Fit door edge trim to edge of stiles after applying veneer facing.

E. Vertical Exposed Edge of Stiles - Veneer Faces: Of same species as veneer facing.

F. Fit door edge trim to edge of stiles after applying veneer facing.

G. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

H. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
   1. Exception: Doors to be field finished.

I. Provide edge clearances in accordance with AWI Quality Standards Illustrated Section 1700.

J. Provide edge clearances in accordance with AWI Quality Standards Illustrated Section 1700.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
   1. Install fire-rated doors in accordance with NFPA 80 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Trim door height by cutting bottom edges to a maximum of 3/4 inch (19 mm).

D. Use machine tools to cut or drill for hardware.

E. Coordinate installation of doors with installation of frames and hardware.

F. Coordinate installation of glazing.

3.03 INSTALLATION TOLERANCES

A. Conform to specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for maximum diagonal distortion.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.05 SCHEDULE - See Drawings

END OF SECTION

SECTION 08212

STILE AND RAIL WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood doors, stile and rail design.

B. Panels of louvers.

1.02 RELATED SECTIONS

A. Section 06200 - Finish Carpentry: Wood door frames.

B. Section 08115 - Steel Door Frames.

C. Section 08710 - Door Hardware.

D. Section 09900 - Paints and Coatings: Site finishing doors.

1.03 REFERENCES

A. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2006, 8th Ed., Version 2.0.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate stile and rail core materials and construction; veneer species, type and characteristics.

C. Specimen warranty.

D. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for louvers.

E. Samples: Submit two samples of door construction, 24x24 inch in size cut from top corner of door.

F. Samples: Submit two samples of door veneer, 24x24 inch in size illustrating wood grain, stain color, and sheen.

G. Manufacturer's Installation Instructions: Indicate special installation instructions.

H. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with AWI/AWMAC Quality Standards Illustrated, Section 1400, Premium grade.

B. Factory finish doors in accordance with AWI/AWMAC Quality Standards Illustrated, Section 1500.

C. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND PROTECTION

A. Package, deliver and store doors in accordance with AWI/AWMAC Quality Standards Illustrated, Section 1300.

B. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 PROJECT CONDITIONS

A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.08 WARRANTY

A. See Section 01780 - Closeout Submittals for additional warranty requirements.

B. Provide warranty to the following term:
   1. Interior Doors: Two (2) years.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Stile and Rail Wood Doors:
   1. Eggers Industries: www.eggersindustries.com.
   2. Enjo Architectural Millwork: www.enjo.com.
   3. The Maiman Company: www.maiman.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 DOOR TYPES

A. Interior Doors: 1-3/4 inches thick unless otherwise indicated; solid lumber construction; mortised and tenoned joints.

2.03 ACCESSORIES

A. Molding: Wood, of same species as door facing, mitered corners; prepared for countersink style tamper proof screws.

B. Wood louvers as indicated on the drawings.

2.04 FABRICATION

A. Fabricate doors in accordance with AWI Quality Standards requirements.

B. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware.

C. Factory fit doors for frame opening dimensions identified on shop drawings.

2.05 FINISH

A. Factory finish doors in accordance with AWI Quality Standards Section 1500:
   1. See drawings for transparent or opaque finish.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out of tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and AWI Quality Standards requirements.

B. Trim door width by cutting equally on both jamb edges.

C. Trim door height by cutting bottom edges to a maximum of 3/4 inch.

D. Machine cut for hardware.

E. Coordinate installation of doors with installation of frames and hardware.

3.03 INSTALLATION TOLERANCES

A. Conform to AWI requirements for fit, clearance, and joinery tolerances.

B. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 x 84 inch surface area.

C. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over an imaginary 36 x 84 inch surface area.

D. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 x 84 inch surface area.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

3.05 SCHEDULE - See Drawings

END OF SECTION

SECTION 08310

ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Access door and frame units, fire-rated and non-fire-rated, in wall, and ceiling locations.

1.02 RELATED SECTIONS

A. Section 04810 - Unit Masonry Assemblies: Openings in masonry.

B. Section 09260 - Gypsum Board Assemblies: Openings in gypsum wall board systems.

C. Section 09511 - Suspended Acoustical Ceilings: Openings in ceilings.

D. Section 09900 - Paints and Coatings: Field paint finish.

E. Division 15: Mechanical components requiring access.

F. Section 15820 - Duct Accessories: Access doors in ductwork.

G. Division 16: Electrical components requiring access.

1.03 REFERENCES

A. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

B. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 DESIGN REQUIREMENTS

A. Fabricate floor access assemblies to support live load of 100 lb/sq ft with deflection not to exceed 1/180 of span.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

C. Shop Drawings: Indicate exact position of all access door units.

D. Manufacturer's Installation Instructions: Indicate installation requirements.

E. Project Record Documents: Record actual locations of all access units.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated access doors.
   1. Provide access doors of fire rating equivalent to the fire rated assembly in which they are to be installed.

B. Provide products listed and labeled by UL or ITS (Warnock Hersey) as suitable for the purpose specified and indicated.

C. Provide certificate of compliance from authority having jurisdiction indicating approval of fire rated doors.

1.07 PROJECT CONDITIONS

A. Coordinate the work with other work requiring access doors.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Access Doors:
   1. Karp Associates, Inc: www.karpinc.com.
   2. Milcor Inc: www.milcorinc.com.
   3. Substitutions: See Section 01600 - Product Requirements.

2.02 ACCESS DOORS AND PANELS

A. All Units: Factory fabricated, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.

B. Floor Units: Design to support live load of 100 lb/sq ft with deflection not to exceed 1/180 of span.

C. Units in Fire Rated Assemblies: Fire rating equivalent to the fire rated assembly in which they are to be installed.

2.03 ACCESS DOOR UNITS - WALLS AND CEILINGS

A. Door and Frame Units: Formed steel.
   1. Frames and flanges: 0.058 inch steel.
   2. Hardware:
      a. Hinge: Concealed constant force closure spring type.
      b. Lock: Screw driver slot for quarter turn cam lock.
   3. Prime coat with baked on primer. Prime exposed edges with one coat of white rust-inhibitive paint.
   4. For fire-rated door units, finish with ceramic fiberboard panel insert attach to outside face of door, ready or field painting.
   5. Finish: No. 4 finish for locations requiring moisture resistant access doors.

B. Non-Fire Rated Door and Frame Units in Walls:
   1. Flush Wall Installation
      a. Style 'SR-III", as manufactured by Cesco Products of Minneapolis, Minnesota.
      b. Model "WB". as manufactured by J.L. Industries of Bloomington. Minnesota.
      c. Type "KDW", as manufactured by Karp Associates, Inc. of Maspeth, New York.
      d. Model "NW" Series, as manufactured by Nystrom, Inc. of Minneapolis, Minnesota.

C. Fire Rated Door and Frame Units in Walls:
   1. Provide rated unit in compliance with the wall's fire rating indicated on the documents.
      a. Style 'FB'. as manufactured by Cesco Products of Minneapolis, Minnesota.
      b. Type "KRP-450 FR, as manufactured by Karp Associates, Inc. of Maspeth, New York.
      c. Model 'IW', as manufactured by Nystrom, Inc. of Minneapolis, Minnesota.
      d. Model 'FDWB Series, as manufactured by J.L. Industries of Bloomington, Minnesota.

D. Non-Fire Rated Door and Frame Units in Ceilings:
   1. Flush with ceiling installation.
      a. Milcor Model 3204 by MiIcor, Inc.
      b. "NW" Series by Nystrom, Inc.
      c. Type "RDW" by Karp Associates, Inc.

E. Fire Rated Door and Frame Units in Ceilings:
   1. Flush with ceiling installation.
      a. Williams Brothers Corporation Model "WB-FRC".
      b. IL. Industries "IDWB" Series.
      c. Nystrom, Inc. "LW" Series.

d. Karp Associates Type "KRP-350-PR'.

2.04 FLOOR UNITS

A. Hatch and Frame Units: Formed steel.
   1. Frames and anchors: 0.058 inch thick.
   2. Hardware:
      a. Lock: Screw driver slot for quarter turn cam lock.
      b. Removable wrench lift handle.
   3. Prime coat with baked on primer. Prime exposed edges with one coat of white rust-inhibitive paint.
   4. For fire-rated door units, finish with ceramic fiberboard panel insert attach to outside face of door, ready or field painting.
   5. Finish: No. 4 finish for locations requiring moisture resistant access doors.
      a. Model L-MPSS manufactured by Larsens of Minneapolis, Minnesota.

2.05 ACCESS UNITS - OTHER CONDITIONS/LOCATIONS

A. Non-Fire-Rated Moisture Resistant Access floors: Stainless steel, multi-purpose access doors. Provide Larsen "L-MPSS" stainless steel frame and 'L-MPSS" stainless steel door, with continuous, offset and concealed hinge and security fastener. Doors shall be as manufactured by Larsens of Minneapolis, Minnesota.

B. Fire Rated Sprinkler System Access Door: U.L. B label 1-1/2 hour rated with automatic closer, U.L. rated anchors for construction in which door will be installed. Provide lockset with knob released, keyed as directed by Owner.

C. Exterior Access Doors: MIFAB Manufacturing, Inc., WID Series, with extruded aluminum frame and extruded aluminum door panel frame. Door panels shall be 20 gauge satin coat steel with optional aluminum sheet.
   1. Provide size(s) indicated on Drawings.
   2. 0.75 PCF fiberglass insulation.
   3. Dual action handle for interior and exterior operation.
   4. Zinc plated steel continuous type hinge.
   5. Extruded EPDM draft seal gasket.
   6. Keyed cylinder lock, keyed into building keying system.

D. Access cover plates for concealed plumbing cleanouts shall be round and similar to Wade #W08470-R, stainless steel.

2.06 FABRICATION

A. Weld, fill, and grind joints to ensure flush and square unit.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings are correctly sized and located.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings. Secure rigidly in place.

C. Position units to provide convenient access to the concealed work requiring access.

END OF SECTION

SECTION 08334

COILING COUNTER DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire-rated coiling counter doors and operating hardware.

B. Electric motor operation; wiring from electric circuit disconnect to operator to control station.

1.02 RELATED SECTIONS

A. Section 09260 - Gypsum Board Assemblies: Openings.

B. Section 09900 - Paints and Coatings: Field paint finish.

C. Division 16 - Fire Alarm System: Fire alarm interconnection.

D. Division 16 - Equipment Wiring: Power to disconnect.

E. Division 16 - Conduit: Conduit from electric circuit to operator and from operator to control station.

F. Division 16 - Conduit: Conduit from fire alarm system.

1.03 REFERENCES

A. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.

B. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2006.

C. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 2007.

D. UL (EAUED) - Electrical Appliance and Utilization Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's standard literature showing materials and details of construction and finish. Include data on electrical operation.

C. Shop Drawings: Indicate rough and actual opening dimensions, anchorage methods, hardware locations, and installation details.

D. Samples: Submit two slats, 4 inches long illustrating shape, color and finish texture.

E. Manufacturer's Instructions: Indicate installation sequence and installation, adjustment, and alignment procedures.

F. Operation and Maintenance Data: Indicate modes of operation, lubrication requirements and frequency, and periodic adjustments required.

G. Project Record Documents: Include as-built electrical diagrams for electrical operation and connection to fire alarm system.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Coiling Counter Doors:
   1. Alpine Overhead Doors, Inc; Product Auto Fire-Shut® with MM Redi-Reset™ DOOR OPERATORS: www.alpinedoors.com.
   2. Substitutions: See Section 01600 - Product Requirements.

2.02 COILING COUNTER DOORS

A. Coiling Counter Doors, Fire-Rated: Stainless steel slat curtain.
   1. Mounting: As indicated.
   2. Fire Rating: As indicated on the drawings; comply with NFPA 80.
   3. Nominal Slat Size: 1-1/4 inches wide.
   4. Slat Profile: Flat.
   5. Finish: No. 4.
   6. Guides: Formed track; same material and finish unless otherwise indicated.
   7. Hood: Manufacturer's standard; primed steel.
   8. Fire Release Mechanism: Electric motor closed, actuated by fire alarm system.
   9. Non-Fire Operation: Electric motor.

2.03 MATERIALS

A. Curtain Construction: Interlocking, single thickness slats.
   1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
   2. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.
   3. Stainless Steel Slats: ASTM A 666, Type 304; minimum thickness 22 gage, 0.03 inch.

B. Guide Construction: Continuous, of profile to retain door in place, with mounting brackets of same metal.
   1. Stainless Steel Guides: ASTM A 666, Type 304, rollable temper.

C. Hood Enclosure: Internally reinforced to maintain rigidity and shape.

D. Latching: Inside mounted, sliding deadbolt.

E. Roller Shaft Counterbalance: Steel pipe and torsion steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.

2.04 ELECTRIC OPERATION

A. Electrically Operated Doors: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

B. Electric Operators:
   1. Mounting: Side mounted.
   2. Motor Enclosure: NEMA MG 1.
   3. Motor Rating: As recommended by manufacturer; continuous duty.
   4. Motor Voltage: 24 volt, single phase, 60 Hz.
   5. Opening Speed: 6 inches per second.
   6. Manual override in case of power failure.

C. Control Station: Standard three button (OPEN-STOP-CLOSE) momentary control for each operator.
   1. 24 volt circuit.
   2. Surface mounted.

D. Safety Edge: Located at bottom of curtain, full width, electro-mechanical sensitized type, wired to stop operator upon striking object, hollow neoprene covered.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. In addition, install fire-rated doors in accordance with NFPA 80.

C. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

D. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

E. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

F. Coordinate installation of electrical service with Division 16.

G. Complete wiring from disconnect to unit components.

H. Complete wiring from fire alarm system .

3.03 ERECTION TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variation From Plumb: 1/16 inch.

C. Maximum Variation From Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

3.04 ADJUSTING

A. Adjust operating assemblies for smooth and noiseless operation.

3.05 CLEANING

A. Clean installed components.

B. Remove labels and visible markings.

END OF SECTION

SECTION 08375

TEMPERED GLASS SHOWER ENCLOSURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Includes shower door / enclosures for Guestrooms as scheduled.

1.02 SUBMJTTALS

A. Submit manufacturer's product data and shop drawings to the Architect in accordance with Section 01300. Shop drawings shall show configurations, materials, finish, installation details, and relationship to adjacent materials and finishes.

PART 2 PRODUCTS

2.01 MATERIALS

A. Provide shower doors and sidelites as manufactured by Sterling a Kohler Company; Kohler, Wisconsin; no substitute. Glass shall conform to ANSI Z97.1 and certified by Safety Glazing Certification Council.
   1. Bypass Doors Series #5176, widths indicated on drawings.
   2. Glass Texture: Rain
   3. Glass Pattern: None
   4. Aluminum Frame Finish: Silver

PART 3 EXECUTION

3.01 INSTALLATION

A. Prior to insta1lation, verify that all surrounding work is complete and that all finishes have been installed.

B. Install enclosure in accordance with manufacturer's instructions. Installations shall be plumb, level and square with surrounding work. Door operation shall be smooth, without bind.

END OF SECTION

SECTION 08410

METAL-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Perimeter sealant.

1.02 RELATED SECTIONS

A. Section 05120 - Structural Steel: Steel attachment members.

B. Section 05500 - Metal Fabrications: Steel attachment devices.

C. Section 07900 - Joint Sealers: Perimeter sealant and back-up materials.

D. Section 08460 - Automatic Entrance Doors.

E. Section 08710 - Door Hardware: Hardware items other than specified in this section.

F. Section 08800 - Glazing: Glass and glazing accessories.

1.03 REFERENCES

A. AA DAF-45 - Designation System for Aluminum Finishes; The Aluminum Association, Inc.; 2003.

B. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 2004.

C. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; American Architectural Manufacturers Association; 2003 (part of AAMA 501).

D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; American Architectural Manufacturers Association; 1998.

E. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2005.

F. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; 2005.

G. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2005.

H. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.

I. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2006.

J. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2006.

K. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.

L. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002.

M. ASTM E 547 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Differential; 2000.

N. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

1.04 PERFORMANCE REQUIREMENTS

A. Design and size components to withstand the following load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
   1. Design Wind Loads: Comply with requirements of ASCE 7.
   2. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.

B. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.

C. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E 283.

D. Condensation Resistance Factor: CRF of 59 when measured in accordance with AAMA 1503.1.

E. Water Leakage: None, when measured in accordance with ASTM E 547 with a test pressure difference of 2.86 lbf/sq ft.

F. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

G. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and inner sheet of infill panel and heel bead of glazing compound.

H. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.

D. Design Data: Provide framing member structural and physical characteristics, engineering calculations, dimensional limitations.

E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State in which the Project is located.

B. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum three years of experience.

1.07 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.08 DELIVERY, STORAGE, AND PROTECTION

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond to aluminum when exposed to sunlight or weather.

1.09 PROJECT CONDITIONS

A. Coordinate the work with installation of firestopping components or materials.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.11 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a two year period after Date of Substantial Completion.

C. Provide two year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide two year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Kawneer Company, Inc.; Product 451T Thermal Framing.

B. Other Acceptable Manufacturers:
   1. United States Aluminum Corp: www.usalum.com.
   2. Vistawall Architectural Products: www.vistawall.com.
   3. Substitutions: Not permitted.

2.02 COMPONENTS

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Finish: High performance organic coating.
   2. Color: As selected from manufacturer's standards.

B. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Framing members for interior applications need not be thermally broken.
   2. Glazing stops: Flush.

3. Cross-Section: As indicated on drawings.
4. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

2.03 MATERIALS

A. Extruded Aluminum: ASTM B 221 (ASTM B 221M).

B. Structural Steel Sections: ASTM A 36/A 36M; galvanized in accordance with requirements of ASTM A 123/A 123M.

C. Fasteners: Stainless steel.

D. Concealed Flashings: 0.018 inch thick stainless steel.

E. Perimeter Sealant: Type E1 (exterior) & A1 (interior) specified in Section 07900.

F. Glass: As specified in Section 08800.

G. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

H. Glazing Accessories: As specified in Section 08800.

I. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.04 FINISHES

A. Comply with AA DAF-45 for aluminum finishes required.

B. High Performance Organic Finish: AAMA 2604; multiple coats, thermally cured fluoropolymer system; color as scheduled.

2.05 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

E. Arrange fasteners and attachments to conceal from view.

F. Reinforce framing members for imposed loads.

G. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Coordinate attachment and seal of perimeter air and vapor barrier materials.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Install glass and infill panels in accordance with Section 08800, using glazing method required to achieve performance criteria.

J. Install perimeter sealant in accordance with Section 07900.

3.03 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 FIELD QUALITY CONTROL

A. See Section 01400 - Quality Requirements, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.

B. Test installed storefront for water leakage in accordance with AAMA 501.2.

3.05 CLEANING AND PROTECTION

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by method acceptable to sealant manufacturer.

D. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

E. Protect finished work from damage.

END OF SECTION

SECTION 08460

AUTOMATIC ENTRANCE DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Automatic sliding doors, with frames.

B. Operators for doors provided in other sections.

C. Actuators and safety devices.

1.02 REFERENCES

A. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2006.

B. NFPA 70 - National Electrical Code; National Fire Protection Association; 2005.

C. UL (ECMD) - Electrical Construction Materials Directory; Underwriters Laboratories Inc.; current edition.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate layout and dimensions; head, jamb, and sill conditions; elevations; components, anchorage, recesses, materials, and finishes, electrical characteristics and connection requirements.
   2. Identify installation tolerances required, assembly conditions, routing of service lines and conduit, and locations of operating components and boxes.

C. Product Data: Provide data on system components, sizes, features, and finishes.

D. Samples: Submit two samples of exposed to view hardware, and attachment hardware.

E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and manufacturer's hardware and component templates.

F. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

G. Maintenance Data: Include manufacturer's parts list and maintenance instructions for each type of hardware and operating component.

H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience.

1.05 PROJECT CONDITIONS

A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.06 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a 5 year period after Date of Substantial Completion.

C. Provide 5 year manufacturer warranty for operating unit.

D. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of the automatic entrance door system that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
   1. Lateral deflection of glass lite edges in excess of 1/175 of their length or 3/4 inch, whichever is less.
   2. Excessive air leakage.
   3. Faulty operation of operators and hardware.
   4. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

1.07 MAINTENANCE PRODUCTS

A. Provide wrenches and tools required for maintenance of equipment.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Automatic Entrance Doors:
   1. Besam Entrance Solutions: www.besam.com.
   2. Dor-O-Matic: www.doromatic.com.
   3. Stanely Magic-Door of Farmington, CT
   4. Horton Automatics of Corpus Christi, TX
   5. Substitutions: See Section 01600 - Product Requirements.

2.02 AUTOMATIC ENTRANCE DOORS

A. Automatic Sliding Door: Bi-parting double leaf track-mounted, electric operation, extruded aluminum glazed door, with frame, and operator concealed overhead.
   1. Operation: Power open, power close operation.
   2. "Outside" Side Actuator: Motion sensor.
   3. "Inside" Side Actuator: Motion sensor.
   4. Hold Open: Toggle switch at inside head of doors.
   5. Door and Frame Finish: Same as adjacent framing system.

B. Security Limited Access Hardware: Exit device mounted on breakaway panel, electric locking system, and controls. This security hardware feature is for the Vestibule to Lobby doors.
   1. Exit Device: Concealed vertical rod type, mid-panel with muntin in door, or push pad; requiring not more than 8 pounds pressure to open; 3/8 inch bar travel.
   2. Electric Lock: 5/8 inch steel bolt in header engaging sliding panel carrier; solenoid operated.
   3. Two Position Switch: Switch between day and night control options.
   4. Day Operation: Normal operation using actuators.

5. Night Operation:
    a. Outside: Actuators deactivated; electric lock prevents forcible entry by positively locking sliding panels.
    b. Outside: In addition to the above, secure actuator card reader operates doors as in day operation; doors reclose and relock.
    c. Inside - at door: Normal actuators deactivated; exit device operates breakaway, complying with NFPA 101 and local codes; swinging panels close and relock after exit.
    d. Inside - remote operation: In addition to above, remote station open/close switch operates electric lock and door; doors reclose and relock.
6. In case of power failure, doors remain locked.

2.03 ACTUATORS

A. Motion Sensor Actuator: Microwave; distance of control sensitivity adjustable.

2.04 ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Electrical Characteristics:
    1. 3 rated load amperes.
    2. 120 volts, single phase, 60 Hz.
    3. 20 amperes maximum fuse size.

B. Motors: NEMA MG 1.

C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.

D. Disconnect Switch: Factory mount disconnect switch in control panel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work and dimensions are as indicated on shop drawings.

B. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

A. Install equipment in accordance with manufacturer's instructions.

B. Provide for thermal expansion and contraction of door and frame units and live and dead loads that may be transmitted to operating equipment.

C. Provide for dimensional distortion of components during operation.

D. Install pneumatic lines and door power units in a manner to prevent condensation or freezing.

E. Coordinate installation of components with related and adjacent work; level and plumb.

3.03 ADJUSTING

A. Adjust door equipment for correct function and smooth operation.

3.04 CLEANING

A. Remove temporary protection, clean exposed surfaces.

3.05 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation, operating components, adjustment features, and lubrication requirements.

END OF SECTION

SECTION 08520

ALUMINUM WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Extruded aluminum windows with fixed sash, operating sash, and infill panels.

B. Factory glazing.

C. Operating hardware.

D. Insect screens.

1.02 RELATED SECTIONS

A. Section 06100 - Rough Carpentry: Wood perimeter shims.

B. Section 07260 - Weather Barriers: Perimeter air and vapor seal between window frame and adjacent construction.

C. Section 07900 - Joint Sealers: Perimeter sealant and back-up materials.

D. Section 08800 - Glazing.

1.03 REFERENCES

A. AA DAF-45 - Designation System for Aluminum Finishes; The Aluminum Association, Inc.; 2003.

B. AAMA/WDMA/CSA 101/I.S.2/A440 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors; American Architectural Manufacturers Association; 2005.

C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 1998.

D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; American Architectural Manufacturers Association; 1998.

E. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels; 2002.

F. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2005.

G. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 2004.

H. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.

I. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2006.

J. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2006.

K. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2006.

L. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.

M. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000.

N. ASTM E 1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2000.

O. FS L-S-125 - Screening, Insect, Nonmetallic; Federal Specifications and Standards; Revision B, 1972.

P. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

1.04 PERFORMANCE REQUIREMENTS

A. Performance Requirements: As specified in PART 2, with the following additional requirements:

B. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.

C. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, or migrating moisture occurring within system.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, information on glass and glazing, and internal drainage details.

C. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations,, and installation requirements.

D. Samples: Submit two samples, 12 x 12 inch in size illustrating typical corner construction, accessories, and finishes.

E. Certificates: Certify that windows meet or exceed specified requirements.

F. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.

1.06 QUALITY ASSURANCE

A. Comply with requirements of AAMA 101 Designation HC50.
   1. Maintain one copy of document on site.

B. Manufacturer and Installer: Company specializing in fabrication of commercial aluminum windows of types required, with not fewer than three years of experience.

1.07 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.08 DELIVERY, STORAGE, AND PROTECTION

A. Comply with requirements of AAMA CW-10.

B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Do not install sealants when ambient temperature is less than 40 degrees F.

B. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.10 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Quaker Windows and Doors; Product Quaker 1200 Series Slider & Quaker 2000 Series Fixed.

B. Other Acceptable Manufacturers:
   1. TRACO: www.traco.com.
   2. Substitutions: See Section 01600 - Product Requirements.

2.02 WINDOWS

A. Windows: Tubular aluminum sections, factory fabricated, factory finished, thermally broken, vision glass, infill panels, related flashings, anchorage and attachment devices.
   1. Performance Requirements: AAMA/WDMA/CSA 101/I.S.2/A440 HC50 for the Quaker 2000 Series Fixed window.
   2. Performance Requirements: AAMA/WDMA/CSA 101/I.S.2/A440 HS-C35 for the Quaker 1200 Series Slider window.
   3. Provide window framing system to permit PTAC louvers to be built into the window system.
   4. Provide window framing system to permit insulated fill panels to be built into the window system where PTAC louvers are not used. See Section 07410 Metal Wall Panels.
      a. Insulated fill panels shall be pre-finished alumnum faced on each side of panel.
      b. Insulated panel; 1-inch thick rigid insulation.
      c. Exterior finish to match PTAC louvers.
      d. Interior finish to match PTAC unit.

B. Fixed, Non-Operable Type:
   1. Construction: Thermally broken.
   2. Glazing: Double; clear; transparent.
   3. Exterior Finish: High performance organic coating.
   4. Interior Finish: High performance organic coating.

C. Horizontal Sliding Type:
   1. Construction: Thermally broken.
   2. Provide screens.
   3. Glazing: Double; clear; transparent.
   4. Exterior Finish: High performance organic coating.
   5. Interior Finish: High performance organic coating.

2.03 COMPONENTS

A. Insect Screen Frame: Rolled aluminum frame of rectangular sections; fit with adjustable hardware; nominal size similar to operable glazed unit.

B. Insect Screens: FS L-S-125, woven plastic mesh; 14/18 mesh size.

C. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to achieve effective weather seal.

D. Glass and Glazing Materials: As specified in Section 08800.

E. Sealant and Backing Materials: As specified in Section 07900.

2.04 MATERIALS

A. Extruded Aluminum: ASTM B 221 (ASTM B 221M), 6063 alloy, T6 temper.

B. Concealed Steel Items: Profiled to suit mullion sections; galvanized in accordance with ASTM A 123/A 123M.

2.05 HARDWARE

A. Sash lock: Lever handle with cam lock.

B. Pulls: Manufacturer's standard type.

C. Bottom Rollers: Stainless steel, adjustable.

D. Guestroom sliding windows, not sliding patio doors, shall have hardware that limits the operating sash from opening not more than 4-inches. This is only applicable to buildings with a Group R Occupancy Classification that have a fully automatic fire suppression system throughout the structure/building.

2.06 FABRICATION

A. Fabricate components with smallest possible clearances and shim spacing around perimeter of assembly that will enable window installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices.

D. Arrange fasteners and attachments to ensure concealment from view.

E. Prepare components with internal reinforcement for operating hardware.

F. Provide steel internal reinforcement in mullions as required to meet loading requirements.

G. Provide internal drainage of glazing spaces to exterior through weep holes.

H. Assemble insect screen frames with mitered and reinforced corners. Secure wire mesh tautly in frame. Fit frame with four, spring loaded steel pin retainers.

I. Double weatherstrip operable units.

J. Factory glaze window units.

2.07 FINISHES

A. Pigmented Organic Coating System: AAMA 2603; polyester or acrylic baked enamel finish; color as scheduled.

B. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings and adjoining air and vapor seal materials are ready to receive aluminum windows.

3.02 INSTALLATION

A. Install windows in accordance with manufacturer's instructions.

B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

D. Install sill and sill end angles.

E. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

F. Coordinate attachment and seal of perimeter air barrier and vapor retarder materials.

G. Install operating hardware not pre-installed by manufacturer.

H. Install glass and infill panels in accordance with requirements specified in Section 08800.

I. Install perimeter sealant in accordance with requirements specified in Section 07900.

3.03 ERECTION TOLERANCES

A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.04 FIELD QUALITY CONTROL

A. Test installed windows for compliance with performance requirements for water penetration, in accordance with ASTM E 1105 using uniform pressure and the same pressure difference as specified for laboratory testing.
   1. If any window fails, test additional windows at Contractor's expense.

B. Replace windows that have failed field testing and retest until performance is satisfactory.

3.05 ADJUSTING AND CLEANING

A. Adjust hardware for smooth operation and secure weathertight closure.

B. Remove protective material from factory finished aluminum surfaces.

C. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.

D. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION

SECTION 08621

CANOPY SKYLIGHT SYSTEM

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Includes:
   1. Design, manufacture and installation of translucent panel insulating skylight system. A complete assembly of extruded cellular UV polycarbonate glazing panels incorporated into a complete system tested and warranted by the manufacturer as a single source system.
   2. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly, weatherability and water-tightness performance requirements. All flashings up to but not penetrating adjoining work are also required as pan of the system and shall be included.
   3. Trained and factory authorized labor with supervision to complete the entire panel installation.

1.02 RELATED SECTIONS

A. Section 05120 - Structural Steel: Steel members supporting the translucent skylight system.

B. Section 07900 - Sealants and Caulking: Sealants installed as a component of the translucent skylight system for a weathertight installation.

1.03 QUALITY ASSURANCE

A. Skylight system must be evaluated and listed by the applicable, recognized building code authorities.

B. Design criteria shall be:
   1. Wind Load: Per applicable Building Code.

C. Materials and Products shall be manufactured by a company continuously and regularly employed in the manufacture of skylights using polycarbonate panel systems for a period of at least ten (10) years. Manufacturers shall provide a list of at least ten (10) projects having been in place a minimum of five (5) years, with similar size, scope, climate and type.

D. Erection shall be by a factory-approved installer which has been in the business of erecting similar material for at least five (5) consecutive years and can show evidence of satisfactory completion of projects of similar size, scope and type.

E. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system, and will ensure that it fully meets all requirements of this specification.

F. Field Measurements: Take all necessary field measurements to verify or supplement dimensions shown on the drawings.

1.04 PANEL SYSTEM PERFORMANCE

A. Thermal and Solar Performance:
   1. Insulation Value ("U") per ASTM C 236 configured for/or NFRC 100 test conditions - 0.48
   2. Light Transmission (L.T.%) 16-75 per ASTM E 1175 or E 972.
   3. Solar Transmission (S.T.) .21-.73 per A S M E 1084 at "normal* (90°) incidence angle.
   4. Color: As selected by Architect from manufacturer's standard color selections.

B. Flammability
   1. The exterior and interior faces shall be an approved light transmitting panel with a CCI fire rating classification per ASTM D 635. Smoke density no greater than 70 per ASTM D 2843 and self ignition temperature of 1058°F per ASTM 1929.
   2. Interior flame spread classification of Class 1 per ASTM E 84.

C. Weatherability:
   1. The exterior and interior faces shall not change color more than 3.0 units (DELTA-E by ASTM D 2244) after 60 months outdoor weathering in Arizona determined by an average of at least two samples.
   2. The exterior and interior faces shall be tested by recognized laboratory for weathering evaluation per ASTM D 4364-84 (EMMAQUA, UNBACKED), after exposure to minimum concentrated natural sunlight radiation of 56000 MJ/M2 (1540 MJ/M2 of UV, 200 - 385 N.M). The exterior and interior faces shall not change:
      a. Color more than 3.0 units Delta E. 5.0 units Delta L and Delta B
      b. Yellowing index more than 10 units Delta Y per ASTM D 1925.
      c. The light transmission as measured by ASTM D1003, shall not decrease more than 6% over 10 years, or after exposure to temperature of 300°F for 25 minutes (thermal aging).
      d. Thermal aging - the interior and exterior faces shall not change color in excess of 0.75 Delta E by ASTM D 2244 and shall not darken more than 0.3 units (Delta L by ASTM D2244) and 0.2 units Delta Y (YI) by ASTM D 1925 and shall not show cracking or crazing when exposed to 300°F for 25 minutes.
      e. The faces shall not become readily detached when exposed to temperatures of 300°F and 0°F for 25 minutes.

D. Longevity and Resistance to Buckling Bending and Pressure:
   1. Longevity: The minimum ratio of the panel weight to the panel thickness should be: For 0.4" thick Pentaglas 10 panel, 0.5 LB. per s.f.
   2. Resistance to buckling, bending and pressure: The extruded panel shall include integral extruded multi-cells, and a truss-like structural core. The panel's exterior skins shall be interconnected and spaced apart by supporting continuous ribs, perpendicular to the skins. at a spacing not to exceed 0.16" (truss-like construction). In addition. the space between the two exterior skins in a cross section shall be divided by multiple parallel intermediate surfaces, at a spacing not to exceed 0.16".

E. Impact Resistance:
   1. The panels shall pass the following tests:
      a. ASTM D 3841lSPI - Impact and Shatter Resistance of 200 ft. lbs.
      b. SFBC - PA 201-94, impact resistance of 350 ft. lbs.

F. Air Infiltration: ASTM D-283 at test pressures of 15.0 PSF - 0.042 SCFM/ft, of dry glazing joint length

G. Water Penetration: No water penetration - ASTM E-331 at test pressure of 15.0 PSF.

H. UV Maintenance: The system shall require no scheduled re-coating to maintain its performance or for UV

I. Diffused Light Transmission: As a reference for measuring the quality of the diffused light through the panel assembly, the IES (Illuminating Engineering Societies) LM-44-1990 Approved Method for Total and Diffuse Reflectometry procedure shall be used. Results for a Clear Pentaglas / Single Glazed panel assembly shall be provided as a base standard for comparison. For Pentaglas / Single Glazed systems with total illuminator flux output at 60 lumens, diffused light transmission requirements are:
   1. Zonal % of Transmittance From the Maximum

2.	Zone	Total Lumens Transmitted Through the Panels
3.	0-30	66.0
4.	0-40	78.5
5.	0-60	94.0
6.	0-90	100.0

1.05 SUBMITTALS

A. Submit shop drawings and color samples in accordance with appropriate Sections in Divison1. Show all materials, finishes, required fasteners and anchorages and relationship to adjoining work.

B. Structural Calculations: Prepare calculations in accordance with current design practice of the Aluminum Association, AISC, AISI and ACI. Include structural analysis for live and dead loads on framing members and anchors and panel system. Calculations must be certified by a registered structural engineer licensed in the State where the project is constructed. Test reports are not an acceptable substitute for calculations.

C. The manufacturer shall submit written guarantee accompanied by substantiating data, stating that the products to be furnished are in accordance with or exceed these specifications.

D. The manufacturer shall submit certified test reports made by an. independent organization for each type and class of panel system. Reports shall verify that the material will meet all performance requirements of this specification. Previously completed test reports will be acceptable if they are current and indicative of products used on this project. Test report required are:
   1. Self Ignition Temperature (ASTM 1929-3)
   2. Smoke Density (ASTM D-2843)
   3. Burning Extent (ASTM D-635)
   4. Interior Flame Spread (ASTM E-84)
   5. Color Difference (ASTM D-2244-85)
   6. Weathering (ASTM D-4364)
   7. Yellowing Index (ASTM D-1925)
   8. Weathering Evaluation before and after exposure to 300°F, 25 minutes include Light Transmission, Color Change, and Yellowing Index, per ASTM E-1175, ASTM D-2244 and ASTM D-I925 respectively.
   9. Light Transmission (ASTM E 1175 or ASTM E 972, ASTM D1003)
   10. Solar Transmission (ASTM E-1084)
   11. Shatter Resistance (ASTM D-3841/SPI. Method B)
   12. Large Missile Test - Impact Resistance per SFBC PA 201-94
   13. Insulation "U" Factor (ASTM C 236 configured for/or NFRC 100 test conditions of 15 m.p.h.)
   14. Air Infiltration (ASTM E 283), at minimum 15 P.S.F.
   15. Water Penetration (ASTM E-331), at minimum 15 P.S.F.
   16. Load Bearing Capability (ASTM E-330-90)
   17. IES LM-34-90 Testing for Total and Diffused Reflectometry (Diffused Light Transmission)

1.06 WARRANTY

A. Provide manufacturer standard I0 year limited warranty to include:
   1. Change in light transmission of no more than 6% per ASM D-1003, and in color (yellowness index) in excess of 10 points, in comparison with the original value.
   2. No delamination of panel affecting appearance, performance or structural integrity of the panel or the system.
   3. Thermal aging - the light transmission and the color shall not change after exposure to heat of 300°F for 25 minutes. (When measured per ASTM D-1003 and ASTM D-2244 respectively).
   4. Certify that skylight frame is free of defects in design, material and manufacturing for a

period of two (2) years from the date of Substantial Completion.

B. Finish Warranty: Submit manufacturer's written 10-year non-prorated warranty covering color fade, chalking, and film integrity.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Manufacturer and Brand: CPI International, Inc. of Lake Forest, Illinois.

B. Substitute Manufacturer: Submit substitute manufacturer in accordance with Section 01600

2.02 SYSTEM APPEARANCE

A. The panels shall be uniform in color, with an integral multi-cell core. In a cross section, the core shall be constructed of small honeycomb cells for thickness of 8-mm to 12-mm not to exceed 0.16" x 0.18-. The appearance shall be equal to CPI's Pentaglas Panel.

B. Panels shall consist of a polycarbonate resin with a permanent. co-extruded, ultra-violet protective layer. This layer shall be co-extruded by a manufacturer during the origin& extrusion of the panel and shall be a permanent part of the exterior layer. Post-applied coating or films of dissimilar materials are unacceptable.

C. The panel assembly's thickness shall be 0.47" with exposed interlocking U battens of similar materials.

D. Panel Width: Shall not exceed 24" to ensure best performance for wind uplift, vibration, oil canning and visual appearance. Panels over 24" wide will not be acceptable.

E. Panel shall be factory sealed at the sill to restrict din and water ingress due to capillary action.

2.03 METAL MATERIALS

A. Extruded aluminum shall be ANSUASTM B 221: 6063-T6 and 6063-T5

B. Flashing

C. 05 H34 aluminum 0.04" minimum thickness.

D. Sheer metal flashings/closures/claddings are to be furnished shop formed to profile - when lengths exceed 10-ft. in nominal 10-ft lengths. Field trimming of the flashing and field forming the ends is necessary to suit as-built conditions. Sheet metal ends are to overlap at least 6-in, to 8-in., set in a full bed of sealant and riveted if required.

E. All fasteners to be stainless steel or Cadmium plated steel. CPI Hurricane design stainless steel clips shall be used where applicable.

F. Finish: Ail exposed aluminum finish shall receive an electrostatically applied, baked-on enamel coating complying with AAMA 603.8 or PVF2 type finish. Brand names shall include Kynar 500 fluorocarbon finish containing 70% fluoropolymer. Color shall be custom, as selected by Architect.

2.04 TRANSLUCENT PANEL JOINT SYSTEM

A. Panel shall be extruded in one single formable length. Maximum panel width shall not exceed 24". Transverse connections are not acceptable. The panels shall be manufactured with upstands which are integral to the unit, and the upstands shall be 90 degrees to the panel face (standing seam dry glazed concept). Welding or gluing of upstands or standing seam is not acceptable. Upstands and battens shall have a double latch locking mechanism to ensure maximum uplift capability.

B. Mullions to be dry glazed profiles, using no sealant, welding, adhesives or gaskets

C. For structural performance, the use of adhesives, plastic welding or sealant is not allowed

D. Free movement of the panels shall be allowed to occur without damage to the weather tightness of the completed system.

PART 3 – EXECUTION

3.01 INSPECTION

A. The skylight contractor shall determine that the structure and substrate to receive the system are properly prepared and ready to receive the work included herein. Responsibility for the accuracy of benchmarks shall be that of the General Contractor.

B. In the event of error in the substrate, the skylight contractor shall so notify the General Contractor in sufficient time for correction without &lay to the project. Erection shall not begin until the faulty work has been corrected.

C. Convene a pre-installation conference at least one week prior to commencing work of this Section. Attendance required of General Contractor, skylight installer and all parties directly affecting and effected by the work of this section.

D. All opening sizes, dimensions and tolerances are to be field verified.

E. Installer to examine area of installation to verify readiness of site conditions. Immediately notify General Contractor in writing about any defects requiring correction. Do not commence work until conditions are satisfactory.

3.02 PREPARATION

A. Contract between aluminum and dissimilar materials shall receive a protective coating for the prevention of electrolytic action and corrosion.

3.03 INSTALLATION

A. The skylights shall be completely erected and panels system installed by the skylight manufacture. The use of common labor will not be acceptable. The installation shall not be subcontracted but shall be performed by the skylight manufacturer's own experienced erection crew.

B. This work shall be done in accordance with the written standards set forth by the skylight manufacturer.

3.04 CLEANING AND CLEANUP

A. Cleaning: Clean completed system, inside and out, promptly after erection and installation of panel system. Remove din and other substances from aluminum and panel surfaces. Clean panels inside and out using cleaning materials and methods recommended by the panel manufacturer.

B. Clean up: Upon completion of the skylight installation, remove from the job site all excess materials, equipment and debris. Leave ready for observation by the Owner and Architect.

C. Final cleaning required prior to Owner occupancy shall be at the expense of the Contractor.

3.05 PROTECTION

A. The installed skylight system shall be protected from damage by the Contractor until date of Substantial Completion. Damage to the skylights/components shall be repaired at no expense to the Owner. Damaged finish shall be repaired in accordance with the finish manufacturer's recommendations. Components with finish damaged beyond repair must be replaced at no expense to the Owner.

END OF SECTION

SECTION 08710

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood, hollow steel, and aluminum doors.

B. Hardware for fire-rated doors.

C. Electrically operated and controlled hardware.

D. Lock cylinders for doors for which hardware is specified in other sections.

E. Thresholds.

F. Weatherstripping, seals and door gaskets.

G. Gate locks.

1.02 RELATED SECTIONS

A. Section 08110 - Steel Doors and Frames.

B. Section 08211 - Flush Wood Doors.

C. Section 08212 - Stile and Rail Wood Doors.

D. Section 08305 - Sliding Glass Doors: Hardware for same, except cylinders; installation of cylinders.

E. Section 08410 - Metal-Framed Storefronts: Hardware for same except cylinders; installation of cylinders.

1.03 REFERENCES

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2003.

B. BHMA A156.1 - American National Standard for Butts and Hinges; Builders Hardware Manufacturers Association, Inc.; 2006 (ANSI/BHMA A156.1).

C. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; Builders Hardware Manufacturers Association; 2003 (ANSI/BHMA A156.2).

D. BHMA A156.3 - American National Standard for Exit Devices; Builders Hardware Manufacturers Association; 2001 (ANSI/BHMA A156.3).

E. BHMA A156.4 - American National Standard for Door Controls - Closers; Builders Hardware Manufacturers Association, Inc.; 2000 (ANSI/BHMA A156.4).

F. BHMA A156.5 - American National Standard for Auxiliary Locks & Associated Products; Builders Hardware Manufacturers Association; 2001 (ANSI/BHMA A156.5).

G. BHMA A156.7 - American National Standard for Template Hinge Dimensions; Builders Hardware Manufacturers Association; 2003 (ANSI/BHMA A156.7).

H. BHMA A156.14 - American National Standard for Sliding & Folding Door Hardware; Builders Hardware Manufacturers Association; 2002 (ANSI/BHMA A156.14).

I. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute; 2000.

J. DHI A115W Series - Specifications for Wood Door and Frame Preparation for Hardware; Door and Hardware Institute; 2000.

K. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute; 2004.

L. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; Door and Hardware Institute; 1996.

M. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

N. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 2007.

O. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association; 2006.

P. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, electrical characteristics and connection requirements.
   2. Submit manufacturer's parts lists and templates.

C. Samples: Prior to preparation of hardware schedule:
   1. Submit 1 sample of hinge, latchset, lockset, and closer illustrating style, color, and finish.
   2. Samples will be incorporated into the Work.

D. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

F. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

G. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with 5 years of experience.

D. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

1.06 PRE-INSTALLATION MEETING

A. Convene one week prior to commencing work of this section.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.08 COORDINATION

A. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware.

B. Furnish templates for door and frame preparation.

C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

D. Coordinate Owner's keying requirements during the course of the Work.

1.09 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Provide five year warranty for door closers.

1.10 MAINTENANCE PRODUCTS

A. Provide special wrenches and tools applicable to each different or special hardware component.

B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

C. Training/Instructions: Provide on-site training for operation and maintenance of the electronic access control system. Training shall be provided by an authorized representative of the manufacturer.

1.11 EXTRA MATERIALS

A. Provide ten extra key lock cylinders for each master keyed group.

PART 2 PRODUCTS

2.01 SUPPLIERS

A. Tesa HT-24; TESA/Entry Systems, Inc.

B. Saflok: Computerized Security Systems.

C. Ilco Systems 700: Ilco-Unican, Inc..

D. Substitutions: See Section 01600 - Product Requirements.

2.02 MANUFACTURERS

A. Hinges:
   1. Bommer Industries, Inc: www.bommer.com.
   2. Hager Companies: www.hagerhinge.com.
   3. Stanley Hardware: www.stanleyworks.com.
   4. McKinney.
   5. Furnish one (1) pair of hinges for all doors up to 5’-O” high.
   6. Furnish one (1) additional hinge for every additional 2‘-6” additional height or fraction thereof.
   7. Spring hinges shall be sized as standard hinges. Guest rooms shall have spring hinges

B. Pivots:
   1. DORMA Group North America: www.dorma-usa.com/usa.
   2. Glynn-Johnson: www.glynn-johnson.com.
   3. McKinney Products Company: www.mckinneyhinge.com.

C. Lock and Latch Sets:
   1. Schlage: www.schlage.com.
   2. Yale Commercial Locks and Hardware: www.yalelocks.com.
   3. Guestroom entry locks shall be TESA Electronic Lockset.
   4. Locks and latches shall be cylindrical type. All cylinder locks and latches for use on 1-3/4" doors shall have 2-3/4" backset and 4-7/8" ASNI strike.

D. Push/Pulls/Stops:
   1. Hager Companies: www.hagerhinge.com.
   2. Hiawatha, Inc: www.hiawathainc.com.
   3. Trimco/Triangle, Quality, Baldwin, Ives.
   4. Stops shall be used at all doors. Wherever possible, wall stops are to be used. Wherever wall stops cannot be used, install floor stops.

E. Crash Stops, Surface Bolt:
   1. Trirnco/Triangle, Ives, Glynn Johnson, DCI.

F. Cylindrical Locksets:
   1. Best Access Systems: www.bestlock.com.
   2. Schlage: www.schlage.com.
   3. Yale Commercial Locks and Hardware: www.yalelocks.com.

G. Mortise Locksets:
   1. Best Access Systems: www.bestlock.com.
   2. Schlage: www.schlage.com.
   3. Yale Commercial Locks and Hardware: www.yalelocks.com.

H. Exit Devices:
   1. DORMA Group North America: www.dorma-usa.com/usa.
   2. Von Duprin: www.vonduprin.com.
   3. Yale Commercial Locks and Hardware: www.yalelocks.com.

I. Closers:
   1. DORMA Group North America: www.dorma-usa.com/usa.
   2. LCN: www.lcnclosers.com.
   3. Yale Commercial Locks and Hardware: www.yalelocks.com.

J. Coordinators:
   1. DCI 600 Series, Ives, Glynn Johnson

K. Thresholds/Gasketing:
   1. National Guard Products, Inc: www.ngpinc.com.
   2. Pemko Manufacturing Co: www.pemko.com.
   3. Zero International, Inc: www.zerointernational.com.

L. Protection Plates:
   1. Hager Companies: www.hagerhinge.com.
   2. Hiawatha, Inc: www.hiawathainc.com.
   3. Triangle Brass Manufacturing Co., Inc: www.trimcobbw.com.
   4. All "Back-of-House" doors shall have stainless steel kick plates.

M. Substitutions: See Section 01600 - Product Requirements.

2.03 GENERAL REQUIREMENTS FOR DOOR HARDWARE PRODUCTS

A. Provide products that comply with the following:
   1. Applicable provisions of Federal, State, and local codes.
   2. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
   3. Applicable provisions of NFPA 101, Life Safety Code.
   4. Fire-Rated Doors: NFPA 80.
   5. All Hardware on Fire-Rated Doors: Listed and classified by UL or ITS (Warnock Hersey) as suitable for the purpose specified and indicated.
   6. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.
   7. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

B. Finishes: Identified in schedule brushed chrome finish .

C. Guestroom connecting doors and stairwell doors shall be provided with cap sweeps, Door and Hardware Systems Model No. CS-36. Guestroom entry doors shall be provided with, Pemko #2173D Door Shoe to allow air movement under the door. Guestroom entry doors and connecting doors shall be provided with Door and Hardware Systems fire threshold Model No. FT-2.75A. Guestroom entry doors shall also be provided with Pemko #S773D Perimeter Seal. Stairwell doors shall be provided with Fire Threshold Door and Hardware Systems Model No. HS 2.75.

D. Frame Seal - On Steel Astragals for Pairs of Doors as manufactured by Door and Hardware Systems, Inc.
   1. For pairs of doors where one (1) active leaf, provide astragal No. 105 “Overlap Astragal”.
   2. For pairs of doors where both leafs are active, provide No. SA “Surface Astragal”.

E. All hardware shall have stainless steel mechanisms as practicable.

F. 180 Degree one-way viewers are required on all Guest Room entry doors, Meeting Room entrance doors and Service doors; refer to Finish Hardware Schedule.

2.04 KEYING

A. Door Locks: Grand master keyed.
   1. Include construction keying and control keying with removable core cylinders.

B. Supply keys in the following quantities:
   1. 5 master keys.
   2. 5 grand master keys.
   3. 3 change keys for each lock.

C. Keying: Refer to “Hardware Schedule”. Keys shall be of nickel silver only, no substitute. Permanently inscribe each key with number of lock that identifies cylinder manufacturer’s key symbol and notation “DO NOT DUPLICATE”.
   1. Provide quantity of magnetic cards for startup and maintenance use as required. Lock cylinders shall be construction master keyed for use during construction only.
   2. Construction master key shall be a type that is made inoperative when locks are installed.
   3. Provide quantity of magnetic cards for maintenance use as required.

2.05 KEY CABINET

A. Cabinet Construction: Sheet steel construction, piano hinged door with cylinder type lock master keyed to building system; 3200 Series Knox-Box manufactured by Knox Company of Irvne, CA.

B. Cabinet Size: Size for project keys plus 10 percent growth.

C. Fully recessed design

D. UL listed alarm tamper switches

E. Hinged door

F. Lock designed for operation by a giased cut key

G. Horizontal metal strips for key hook labelling with clear plastic strip cover over labels.

H. Finish: Baked enamel, color as selected.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.

B. Verify that electric power is available to power operated devices and of the correct characteristics.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.

D. Mounting heights for hardware from finished floor to center line of hardware item:
   1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
   2. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."

E. Location of Hardware: The locations of hardware on door and frames shall be in accordance with the requirements of The National Association of Architectural Metal Manufacturers Association (NAAMM), The Steel Door Institute, Americans with Disabilities Act (ADA) and other applicable handicapped codes and ordinances.
   1. Where location of levers or knobs are not indicated, they shall be centered 38” above the floor.
   2. Deadlocks and deadbolts shall be located 60” above the floor at Standard Rooms and 48” above the floor at Accessible Rooms.
   3. Door guards locks shall be located 60” above the floor at Standard Rooms and 48” above the floor at Accessible Rooms. Install with tamper-proof screws and vandal-resistant pivot pin.
   4. Door viewers shall be located 54”-60” above the floor. Provide an additional viewer at 46” above the floor at Accessible Rooms.
   5. Exit bolts shall be located 38” above the floor and installed in accordance with manufacturer’s recommendations.
   6. Pushplates and Pushbars: 45” from finished floor to centerline.
   7. Door Pull: 45” from finished floor to centerline of pull.

F. Set all thresholds in full bed of sealant and anchor with 1/4” machine screws and expansion or lead shields.

G. At points where aluminum comes into contact with steel, prime the steel first with asphalt paint then attach aluminum members.

H. All door silencers will be installed after doors and frames have received final painting. Under no circumstances will door silencers be painted.

I. Cylindrical locksets shall be fastened to the door with through-bolts and threaded chassis hubs. The through bolts shall be outside the 2-1/8” door preparation to prevent chassis rotation, and be a minimum of 2-3/4” center to center. Through bolts shall be attached to each external spring cage to prevent binding of the lock chassis.

J. Surface mounted hardware, such as closers, bolts, exit devices, shall be thru-bolted, utilizing bolts, nuts and washers.

K. Provide electrical power and control wiring system for the electronic access control system. Comply with requirements of the system manufacturer.

3.03 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01400.

B. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.04 ADJUSTING

A. Adjust work under provisions of Section 01700.

B. Adjust hardware for smooth operation.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01700.

B. Do not permit adjacent work to damage hardware or finish.

3.06 SCHEDULE - Attached.

END OF SECTION

SECTION 08746

LOW-ENERGY DOOR OPERATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electro-mechanical low energy powered door operators, opening force not exceeding 8.5 lb-force.

1.02 RELATED SECTIONS

A. Division 16 Electrical: 115 VAC, single-phase, 15 amp fused circuit to door headers, two 24 VAC Class II wires between door headers and remote activation devices, 1/2 inch (12 mm) conduit and electrical boxes at activators.

1.03 REFERENCES

A. BHMA A156.19 - American National Standard for Power Assist and Low Energy Power Operated Doors; Builders Hardware Manufacturers Association; 2002 (ANSI/BHMA A156.19).

B. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Underwriters Laboratories Inc.; 2002.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's catalog data, detail sheets, and specifications.

C. Shop Drawings: Prepared specifically for this project; show dimensions of operators and interface with other products.

D. Operating and Maintenance Data: Operating and maintenance instructions, parts lists, and wiring diagrams.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Factory-trained, with minimum 3 years of experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturer: Dor-O-Matic; 7350 West Wilson Avenue, Harwood Heights, IL 60656-4786. ASD. Tel: (708) 867-7400 or (800) 543-4635. Fax: (708) 867-0291.

B. Provide all door operators from a single manufacturer.

2.02 OPERATORS

A. Operators: Comply with BHMA A156.19 and UL 325.
   1. Operation: Push button, push plate, switch actuator, manual or field programmable manual/electric power assisted Push-N-Go opening with power boost closing and holding.
   2. Close and center door against stop after each cycle, and hold against drafts, winds, and stack pressure.
   3. Make door safely stop and reverse if an object is encountered in the opening or closing cycle.
   4. Manual opening force: 8.5 lb-force maximum.
   5. Closing force: 5 lb-force.
   6. Factory-set door hold-open voltage.
   7. Manual "On-Off-Hold Open" switch.

8. Fail safe: In event of power failure, make door operate manually with controlled spring close as though equipped with a manual door closer, without damage to operator components.
9. Provide adjustment by microprocessor control for opening speed, back check, hold open, from 5 to 30 seconds, closing speed, opening force (torque limiting), and acceleration during opening and recycling, for soft start.

B. Equipment: Completely electro-mechanical; comply with BHMA A156.19 and UL 325.
1. Control box and motor/gear box: Contained in aluminum housing; precision-machined gears and bearing seats and all-weather lubricant, mounted on vibration isolators.
   a. Design for concealed overhead application.
2. Gears: Manufactured by operator manufacturer specifically for operators.
3. Motor: DC permanent magnet motor with shielded ball bearings. Stop motor when door stops or is fully open and when break-away is operated.
4. Door operating arm: Forged steel, attached at natural pivot point of door; do not use slide block in top of door.
5. "On-Off-Hold Open" switch: Three-position toggle or rocker type.
6. Control circuits for actuators and safeties: Low voltage, NEC Class II.
7. Service conditions: Satisfactory operation between minus 30 degrees F and 160 degrees F.
8. Power supply required: 115 VAC.
9. Microprocessor control: 115 VAC. Do not use microswitches. Mount control in snap-in type control box.

C. Enclosure: Extruded aluminum header concealing all operating parts except arms and manual control switches.
1. Concealed Overhead Mounting: In ceiling or frame header, accessed through cutout; conceal door arm when door is closed.
2. Provide bottom loading header for access to controls and removable components without removal of door or operator.
3. No exposed fasteners.
4. Finish of Exposed Headers: Anodized aluminum.
5. Color: To match door.

2.03 ACTIVATORS

A. Motion Detector:.

B. Card Reader:.

2.04 MARKINGS

A. Decals: Visible from either side, instructing the user as to the operation and function of the door.

B. Signs: Provide signs complying with ANSI A156.10 and applicable codes; white letters on red background.
1. Outside: "AUTOMATIC SLIDING DOOR."
2. Inside (push side for breakaway): "IN EMERGENCY PUSH TO OPEN."

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that door openings and doors are properly installed and ready for installation of door operators.

B. Verify that electrical service is available, properly located, and of proper type.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions; comply with BHMA A156.19.

B. Verify that electrical connections are made correctly and with dedicated grounding.

3.03 ADJUST AND CLEAN

A. Adjust door operators for proper operation, without binding or scraping and without excessive noise.

END OF SECTION

SECTION 08800

GLAZING

PART I GENERAL

1.01 SECTION INCLUDES

A. Includes hut is not limited to the materials, fabrication and installation of the following:
   1. Glass and glazing in aluminum framing and all aluminum entrance doors.
   2. Door view lites, fire-rated and non-fire-rated.
   3. Mirrors.
   4. All accessories required for complete and weathertight glazing.

1.02 RELATED SECTIONS

A. Section 08110 - Steel Doors and Frames: Glass installed in hollow metal work.

B. Section 08120 - Aluminum Doors and Frames: Glass installed in aluminum doors and aluminum frames occuring at interior and exterior locations.

C. Section 08211 - Flush Wood Doors: View lites installed in wood doors.

D. Section 08410 - Metal-Framed Storefronts: Glass installed in entrance doors and exterior aluminum framing systems.

E. Section 08462 - Automatic Sliding Doors: Glass installed in entrance doors and sidelites.

F. Section 08520 - Aluminum Windows: Applicable portions of this Section apply to Section 08520 as if repeated therein.

1.03 QUALITY ASSURANCE

A. Inspection of Glass Insulating Glass Units During Fabrication: Quality control shall be established for washing, assembly and packaging stages of production. Units shall he inspected for primary seal continuity, sight-line consistency and foreign material sealed in lite.

B. Glass Quality Standards:
   1. Tempered glass shall comply with the requirements of:
      a. ASTM C 1048, coated and uncoated.
      b. Consumer Product Safety Commission 16-CFR, Part 1201 Category II.
   2. Wire glass shall comply with ANSI Z97.1.
   3. Insulating glass shall meet the requirements of ASTM E 774A, Class A.
   4. Mirror quality shall comply with ASTM C 1036. Type I, Class 1, Quality q1.

C. Select type and thickness of exterior glass to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with Local code.
   1. Use the procedure specified in ASTM E 1300 to determine glass type and thickness.
   2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
   3. Thicknesses listed are minimum.

1.04 SUBMITTALS

A. Submit copies of technical data and shop drawings on items specified herein to the Architect in accordance with Section 01340. Reference shall be made to room names and numbers and schedule numbers shown on the drawings.

B. One (1) 12x12 sample or each type and thickness of glass shall he submitted for approval. Submit manufacturer’s certification that materials submitted meet specification requirements.

C. PRODUCT DELIVERY, STORAGE AND HANDLING

D. All glass and related materials shall arrive at the job site properly packed and crated and marked to agree with the approved shop drawings and bearing factory labels on each pane. Labels shall not he removed until final inspection.

E. Store material under cover on wood runners on floors in an upright position and in a manner that will prevent damage.

1.05 GUARANTEES

A. Provide manufacturer's standard 10-year warranty protecting insulating glass against failure of seal. Replace glass (material and labor) units failing to perform during this warranty period at no cost to the Owner.

B. Guarantee for Unframed Mirrors: Warrant against silver spoilage for ten (10) year period.

C. Date of warranties shall commence at the Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MATERIALS

A. Exterior Aluminum Entrance Doors and Sidelites and Exterior Automatic Entrance Doors and Sidelite Panels: Glaze with 1" insulating, tempered glass.
   1. Inboard Lite: 1/4" thick, clear tempered.
   2. Outboard Lite: 1/4" thick, color as schedule tempered.

B. Aluminum Storefront Glazing & other exterior windows - Typical Exterior Installations: 1" Insulating glass. Provide fully tempered glass assemblies at door sidelites and as required by State and local codes and ordinances that designate the glazing size and location to be a hazardous condition.
   1. Inboard Lite: 1/4" thickness, clear.
   2. Outboard Lite: 1/4" thickness, color as scheduled.

C. Interior glazing of aluminum framing system and aluminum doors shall be 1/4" clear glass. Provide tempered glass at doors and sidelites and as required by State and local codes and ordinances that designate the glazing size and location to be a hazardous condition.

D. Automatic Entrance Doors and Sidelites at Interior of Vestibule, Interior Aluminum Entrance Doors and Interior Aluminum Framing: 1/4" Clear, tempered glass.

E. View Lites - Interior Doors and Interior Hollow Metal Framing:
   1. Glass in Non-Fire-Rated Assembly: 1/4" Clear tempered.
   2. Glass in Fire-Rated Assembly: 1/4" Thickness woven wire, square pattern, clear float glass, Underwriter's laboratories labeled.

F. Mirrors: Sized as indicated, fabricated of 1/4" float glass with silvered backing. The silvering shall be protected with a film of copper electrolytically deposited directly over the silvered surface. A protective coating of two (2) coats of an approved minor backing paint shall be applied over the copper backing. Clear varnish will not be acceptable. Edges of mirrors shall be ground smooth and polished. Provide mirrors with standard edge coating treatment (PPG UC-4401) to protect silvering from chemical attack.
   1. Exercise Room: Mirror glass shall be tempered.

G. Accessories:
   1. Glazing tape shall be Tremco Polyshim, as manufactured by Tremco of Cleveland, Ohio.
   2. Glazing sealant shall be Spectrem 2, as manufactured by Tremco of Cleveland, Ohio.
   3. Neoprene setting blocks shall have a Shore 'A' hardness of 70-90 and be chemically compatible with any sealant used.
   4. Glazing Gaskets for Entrance Doors and Aluminum Framing Systems: Provided as a component of the framing system. Provide manufacturer's standard EPDM glazing gaskets for specified system.
   5. Exposed Mirror Clips
      a. Top Clip: Knape & Vogt #318, 9/16" wide x 1-1/4" long.
      b. Bottom Clip: Continuous clip at base.

PART 3 EXECUTION

3.01 GENERAL

A. Watertight and airtight installation of each glass product is required, except changes, wind loading, impact loading (for doors), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.

B. Protect glass from damage during handling and installation, and subsequent operation of glazed components of the work. During installation, discard units with significant edge damage or other imperfections.

3.02 INSTALLATION

A. Glass installation in aluminum entrances and framing systems shall be in accordance with the printed instructions of the system manufacturer, using glazing beads, stops, etc., compatible with the framing the system and designed specifically for this purpose.

B. Glass Installation in Wood Doors and Hollow Metal Doors: Glaze using polyvinylchloride tape applied to both sides, all stops. Place tape with butted joints. Compress tape approximately 30%. Center glazing material in rabbet. Support glass all around with neoprene setting blocks, with no metal-to-glass or wood-to-glass contact. Draw up glazing heads with equal pressure all around.

C. Tempered Glass: Position bug or hallmark on unit so final position in framed opening occurs consistently in lower right hand corner of unit, parallel to floor in inconspicuous location.

D. Cutting or altering lites of tempered or insulating glass in field is prohibited.

E. Wire Glass: Install in openings in accordance with manufacturer's installation instructions to conform to labeling requirements; use special supplied caulking material.

F. Mirrors shall be installed after wall surfaces have received the prime coat of paint. Where wallcovering is to be installed, omit wallcovering behind mirror to permit adhesive mounting of the mirrors to the drywall substrate. Install mirrors utilizing a combination of stainless steel clips and Palmer Mirror-Mastic. Apply mastic to back side of mirror in accordance with manufacturer's recommendations. Mastic thickness shall permit the use of the mirror mounting clips without putting the mirror in a bind when the clips are installed. Install mirrors with continuous J-clip at the mirror bottom edge. At Exercise Room, provide continuous aluminum J-clips at top edge and bottom edge of mirrors in addition to the use of the Palmer adhesive. All installations shall he square, plumb and level.

3.03 PROTECTION AND CLEANING

A. After all construction has been completed and prior to Substantial Completion inspection and the possibility of glass breakage has been reduced to a minimum, remove all labels. Wash and polish glass on both faces, removing all paint, smears and spots. Glass broken or damaged before the Substantial Completion shall be replaced with glass of a like kind and quality at no expense to the Owner.

B. Remove all excess materials and debris from the project site.

END OF SECTION

SECTION 08816

FIRELITE®NT - FIRE-RATED GLASS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Fire-rated glazing materials installed as vision lights in fire-rated doors.
   2. Fire-rated glazing materials installed as borrowed lites in fire-rated frames.

B. Related Sections include the following:
   1. Section 06400 “Architectural Woodwork” for wood frames for doors, sidelights, transoms, borrowed lights.
   2. Section 08110 “Steel Doors and Frames” for vision panels in interior doors and interior vision panel (borrowed lites) frames.
   3. Section 08211 “Flush Wood Doors” for vision panels in interior doors.
   4. Section 08112 “Stile and Rail Wood Doors” for vision panels in interior doors.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E2074-00: Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.
   2. ASTM E2010-01: Standard Test Method for Positive Pressure Fire Tests of Window Assemblies.

B. American National Standards Institute (ANSI):
   1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings

C. Consumer Product Safety Commission (CPSC):
   1. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials

D. Glass Association of North America (GANA):
   1. GANA – Glazing Manual.
   2. FGMA – Sealant Manual.

E. National Fire Protection Association (NFPA):
   1. NFPA 80: Fire Doors and Windows.
   2. NFPA 252 – Fire Tests of Door Assemblies.
   3. NFPA 257 – Fire Tests of Window Assemblies.

F. Underwriters Laboratories, Inc. (UL):
   1. UL 9 – Fire Tests of Window Assemblies.
   2. UL 10B – Fire Tests of Door Assemblies.
   3. UL 10C – Positive Pressure Fire Tests of Door Assemblies.

G. Current Building Code used by the Authority having Jurisdiction.

1.03 PERFORMANCE REQUIREMENTS

A. Fire-rated glass ceramic clear and wireless glazing material with surface-applied film listed for use in impact safety-rated locations such as doors, transoms and borrowed lites with fire rating requirements ranging from 20 minutes to 3 hours with hose stream test.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements for submittal procedures.

B. Product data: Submit manufacturer's technical data for each glazing material required, including installation and maintenance instructions.

C. Certificates of compliance from glass and glazing materials manufacturers attesting that glass and glazing materials furnished for project comply with requirements. Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.

D. Product Test Listings: From UL indicating fire-rated glass complies with requirements, based on comprehensive testing of current product.

E. Samples: Submit, for verification purposes, approx. 8-inch by 10-inch sample for each type of glass indicated.

1.05 QUALITY ASSURANCE

A. Glazing Standards: FGMA Glazing Manual and Sealant Manual.

B. Fire Protective Rated Glass: Each lite shall bear permanent, nonremovable label of UL certifying it for use in tested and rated fire protective assemblies.

C. Fire Protective Glazing Products for Door Assemblies: Products identical to those tested per ASTM E 152, labeled and listed by UL or WHI or other certification agency acceptable to authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials under provisions of Section 01600.

B. Deliver materials to specified destination in manufacturer's or distributor's packaging, undamaged, complete with installation instructions.

C. Store off ground, under cover, protected from weather and construction activities.

1.07 WARRANTY

A. Provide manufacturer's limited warranty under provision of Division 1.

B. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 FIRE-RATED GLAZING MATERIALS

A. Supplier: FireLite®NT as supplied by Technical Glass Products, Kirkland, Washington, voice 1-800-426-0279, fax 1-800-451-9857, e-mail sales@fireglass.com, web site www.fireglass.com

B. Properties:
   1. Thickness: 3/16 inch [5 mm] Firelite®.
   2. Film: 3M Scotchshield Ultra Film.
   3. Weight: 2.4 lbs./sq. ft.
   4. Approximate Visible Transmission: 88 percent.
   5. Approximate Visible Reflection: 9 percent.
   6. Hardness (Vicker's Scale): 700.
   7. Fire-rating: 20 minutes to 3 hours for doors; 20 minutes to 90 minutes for other applications.
   8. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
   9. Positive Pressure Test: UL 10C, UBC 7-2 and 7-4; passes.
   10. Surface Finish: Premium (polished).

C. Maximum sheet sizes based on surface finish:
   1. Premium: 48 inches by 96 inches.

D. Labeling: Permanently label each piece of FireLite®NT with the FireLite® logo, UL logo and fire rating in sizes up to 3,325 sq. in., and with the FireLite label only for sizes that exceed the listing (as approved by the local authority having jurisdiction).

E. Fire Rating: Fire rating listed and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E2074-00, ASTM E2010-01, NPFA 252, NFPA 257, UL 9, UL 10B and UL 10C.

F. Substitutions: No substitutions allowed.

2.02 GLAZING COMPOUND FOR FIRE-RATED GLAZING MATERIALS

A. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent. Glass panels that exceed 1,393 sq. inches for 90-minute ratings must be glazed with fire-rated glazing tape supplied by manufacturer.

B. Setting Blocks: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.

C. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

2.03 FABRICATION

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine glass framing, with glazier present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
   2. Minimum required face or edge clearances.
   3. Observable edge damage or face imperfections.

B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

C. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.02 INSTALLATION (GLAZING)

A. Comply with referenced FGMA standards and instructions of manufacturers of glass, glazing sealants, and glazing compounds.

B. Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.

C. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.

D. Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.

E. Place setting blocks located at quarter points of glass with edge block no more than 6 inches from corners.

F. Glaze vertically into labeled fire-rated metal frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit.

G. Place glazing tape on free perimeter of glazing in same manner described above.

H. Install removable stop and secure without displacement of tape.

I. [Use specified glazing compound, without adulteration; bed glazing material in glazing compound; entirely fill all recess and spaces. Provide visible glazing compound with smooth and straight edges.]

J. Install in vision panels in fire-rated doors to requirements of NFPA 80.

K. Install so that appropriate [UL] [FireLite®NT] markings remain permanently visible.

3.03 PROTECTION AND CLEANING

A. Protect glass from contact with contaminating substances resulting from construction operations. Remove any such substances by method approved by glass manufacturer.

B. Wash glass on both faces not more than four days prior to date scheduled for inspections intended to establish date of substantial completion. Wash glass by method recommended by glass manufacturer.

3.04 GLAZING SCHEDULE

A. Individual lite sizes cannot exceed maximum exposed area shown in the attached Table.

SECTION 08816 - FIRE-RATED GLASS – FireLite®NT TABLE

GLAZING SCHEDULE

Rating	Assembly	Max. Exposed Area (Sq. In.)	Max. Width Of Exposed Glazing (In.)	OR	Max. Height Of Exposed Glazing (In.)	Stop Height
20 min.	Doors					
	HMS or wood*	3,204	36		89	5/8”
	Fireframes D.S.	3,204	36		89	3/4"
	Other than doors					
	HMS or wood	3,325	95		95	5/8”
	Fireframes D.S.	3,325	95		95	3/4"
45 min.	Doors					
	HMS or wood	3,204	36		89	5/8”
	Fireframes D.S.	3,204	36		89	3/4"
	Other than doors					
	HMS or wood	3,325	95		95	5/8”
	Fireframes D.S.	3,325	95		95	3/4"
60 min.	Doors (non-temp rise)					
	HMS or wood	3,204	36		89	5/8”
	Fireframes D.S.	3,204	36		89	3/4"
	Doors (temp rise)	100	12		33	5/8”
	Other than doors					
	HMS or wood	3,325	95		95	5/8”
	Fireframes D.S.	3,325	95		95	3/4"
90 min.	Doors (non-temp rise)	2,034		36		56 ½” 3/4"
	Doors (temp rise)	100	12		33	1/2”
	Other than doors					
	HMS	2,627	56 ½”		56 ½”	5/8”
	Fireframes D.S.	2,627	56 ½”		56 ½”	3/4"
3 hours	Doors	100	12		33	1/2”

* HMS indicates hollow metal steel framing. Fireframes D.S. indicates Designer Series narrow profile framing by Forster. For wood frames, check with manufacturer for maximum tested glass sizes.

END OF SECTION

SECTION 08830

MIRRORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass mirrors.

1.02 RELATED SECTIONS

A. Section 06200 - Finish Carpentry: Wood frames for mirrors.

B. Section 10800 - Toilet, Bath, and Laundry Accessories: Metal-framed mirrors.

1.03 REFERENCES

A. ASTM C 1036 - Standard Specification for Flat Glass; 2006.

B. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 2004.

C. GANA (TIPS) - Mirrors Handle with Extreme Care: Tips For the Professional on the Care and Handling of Mirrors; National Association of Mirror Manufacturers; 2004.

1.04 PERFORMANCE REQUIREMENTS

A. Limit mirrored glass deflection to 1/200 or flexure limit of glass with full recovery of glazing materials, whichever is less.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data on Mirror Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. Manufacturer's Certificate: Certify that mirrors, meets or exceeds specified requirements.

E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual for glazing installation methods.

B. Fabricate, store, transport, receive, install, and clean mirrors in accordance with GANA recommendations.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Do not install mirrors when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.08 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for reflective coating on mirrors and replacement of same.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Mirrors:
   1. Binswanger Mirror/ACI Distribution: www.binswangermirror.com.
   2. Lenoir Mirror Co: www.lenoirmirror.com.
   3. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Mirror Glass - General: Select materials and/or provide supports as required to limit mirrored glass deflection to 1/200 or flexure limit of glass with full recovery of glazing materials, whichever is less.

B. Mirror Glass: ASTM C 1036, Type 1 transparent flat, Class 1 clear, Quality Q1 (mirror select); 6 mm minimum thick.
   1. Sizes noted on Drawings.

2.03 GLAZING ACCESSORIES

A. Glazing Clips: Manufacturer's standard type.

B. Mirror Attachment Accessories: Stainless steel J-profile channels.

C. Mirror Adhesive: Chemically compatible with mirror coating and wall substrate.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for mirrored glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive mirrors.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

3.03 INSTALLATION - GENERAL

A. Install mirrors in accordance with GANA recommendations.

B. Set mirrors plumb and level, free of optical distortion.

C. Set mirrors with edge clearance free of surrounding construction including countertops or backsplashes.

D. Frameless Mirrors: Set mirrors with adhesive, applied in accordance with adhesive manufacturer's instructions. Provide continuous channel support and clips at top of mirrors. Anchor channels and clips rigidly to wall construction.

3.04 CLEANING

A. Remove wet glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean mirrors and adjacent surfaces.

3.05 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste.

END OF SECTION

SECTION 09255 – COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Non load-bearing steel framing members for gypsum board assemblies and exterior walls.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 6 Section "Rough Carpentry" for wood framing and furring, and gypsum sheathing applied over wood framing.

1.3 DEFINITIONS

A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.5 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of product specified.

1.6 QUALITY ASSURANCE

A. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer, unless otherwise indicated.

B. Fire-Test-Response Characteristics: Where fire-resistance-rated gypsum board assemblies are indicated, provide gypsum board assemblies that comply with the following requirements:

1. Fire-Resistance Ratings: As indicated by GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
2. Gypsum board assemblies indicated are identical to assemblies tested for fire resistance according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

3. Deflection and Firestop Track: Top runner provided in fire-resistance-rated assemblies indicated is labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

1. Steel Framing and Furring:

a. Clark Steel Framing, Inc.
b. Consolidated Systems, Inc.
c. Dale Industries, Inc.
d. Dietrich Industries, Inc.
e. Marino/Ware (formerly Marino Industries Corp.).
f. National Gypsum Co.; Gold Bond Building Products Division.
g. Unimast, Inc.

2.2 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS

A. General: Provide components complying with ASTM C 754 for conditions indicated.

B. Cast-in-Place and Postinstalled Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials, with holes or loops for attaching hanger wires, and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling construction, as determined by testing according to ASTM E 488 conducted by a qualified independent testing agency.

1. Cast-in-place type designed for attachment to concrete forms.
2. Chemical anchor.
3. Expansion anchor.

C. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190 conducted by a qualified independent testing agency.

D. Wire Ties: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper, 0.062 inch (1.6 mm) thick.

E. Wire Hangers: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper, 0.162-inch (4.1-mm) diameter.

F. Hanger Rods: Mild steel and zinc coated or protected with rust-inhibitive paint.

G. Flat Hangers: Mild steel and zinc coated or protected with rust-inhibitive paint.

H. Angle-Type Hangers: Angles with legs not less than 7/8 inch (22.2 mm) wide, formed from 0.0635-inch- (1.6-mm-) thick galvanized steel sheet complying with ASTM A 653, G 90 (ASTM A 653M, Z 180) coating designation, with bolted connections and 5/16-inch (8-mm) diameter bolts.

I. Channels: Cold-rolled steel, 0.0598-inch (1.5-mm) minimum thickness of base (uncoated) metal and 7/16-inch- (11.1-mm-) wide flanges, and as follows:

1. Carrying Channels: 1-1/2 inches (38.1 mm) deep, 475 lb/1000 feet (70 kg/100 m), unless otherwise indicated.

J. Steel Studs for Furring Channels: ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch- (5-mm-) wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:

1. Thickness: 0.0179 inch (0.45 mm), unless otherwise indicated.
2. Depth: 1-5/8 inch (41.3 mm), unless otherwise indicated.
3. Protective Coating: Manufacturer's standard corrosion-resistant coating.

K. Steel Rigid Furring Channels: ASTM C 645, hat shaped, depth of 7/8 inch (22.2 mm), and minimum thickness of base (uncoated) metal as follows:

1. Thickness: 0.0179 inch (0.45 mm), unless otherwise indicated.
2. Protective Coating: Manufacturer's standard corrosion-resistant coating.

L. Grid Suspension System for Interior Ceilings: ASTM C 645, manufacturer's standard direct-hung grid suspension system composed of main beams and cross-furring members that interlock to form a modular supporting network.

2.3 STEEL FRAMING FOR WALLS AND PARTITIONS

A. General: Provide steel framing members complying with the following requirements:

1. Protective Coating: ASTM A 653, G 40 (ASTM A 653M, Z 90) hot-dip galvanized coating.

B. Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch- (5-mm-) wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth: NOTE: See Architectural drawings or Structural specifications and/or drawings for sizes, guages, etc.

1. Thickness: 0.0179 inch (0.45 mm), unless otherwise indicated.
2. Thickness: 0.0329 inch (0.84 mm) as follows:

a. For head runner, sill runner, jamb, and cripple studs at door and other openings.
b. In locations to receive cementitious backer units.

2. Depth: As indicated.
4. Design: All Perimeter studs to be designed for a horizontal deflection no greater than L/360.

C. Deflection Track: Manufacturer's top runner complying with the requirements of ASTM C 645 and with 2-inch- (50.8-mm-) deep flanges.

D. Steel Rigid Furring Channels: ASTM C 645, hat shaped, depth and minimum thickness of base (uncoated) metal as follows:

1. Thickness: 0.0329 inch (0.84 mm), unless otherwise indicated.
2. Depth: 7/8 inch (22.2 mm).

E. Steel Channel Bridging: Cold-rolled steel, 0.0598-inch (1.5-mm) minimum thickness of base (uncoated) metal and 7/16-inch- (11.1-mm-) wide flanges, 1-1/2 inches (38.1 mm) deep, 475 lb/1000 feet (45 kg/100 m), unless otherwise indicated.

F. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum board manufacturers for applications indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to which framing systems attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Ceiling Anchorages: Coordinate installation of ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.

3.3 INSTALLING STEEL FRAMING, GENERAL

A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.

B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with United States Gypsum Co.'s "Gypsum Construction Handbook."

C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details shown on Drawings.

1. Where building structure abuts ceiling perimeter or penetrates ceiling.
2. Where partition framing and wall furring abut structure, except at floor.

a. Provide slip- or cushioned-type joints as detailed to attain lateral support and avoid axial loading.

b. Install deflection and firestop track top runner at fire-resistance-rated assemblies where indicated.

D. Do not bridge building control and expansion joints with steel framing or furring members. Independently frame both sides of joints with framing or furring members as indicated.

3.4 INSTALLING STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS

A. Screw furring members to framing.

B. Suspend ceiling hangers from building structural members 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 structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
4. Secure flat, angle, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for structure as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or otherwise fail.
5. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
6. Do not attach hangers to steel deck tabs.
7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

C. Sway-brace suspended steel framing with hangers used for support.

D. Install suspended steel framing components in sizes and at spacings indicated, but not less than that required by the referenced steel framing installation standard.

1. Wire Hangers: 48 inches (1219 mm) o.c.
2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.

E. Installation Tolerances: Install steel framing components for suspended ceilings so that cross-furring or grid suspension members are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) as measured both lengthwise on each member and transversely between parallel members.

F. Wire-tie or clip furring members to main runners and to other structural supports as indicated.

G. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.5 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS

A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.

1. Where studs are installed directly against exterior walls, install asphalt felt strips or foam gaskets between studs and wall.

B. Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.

C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

1. Cut studs 1/2 inch (13 mm) short of full height to provide perimeter relief.
2. For STC-rated and fire-resistance-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid structural surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed, to support gypsum board closures needed to make partitions continuous from floor to underside of solid structure.

D. Install steel studs and furring in sizes and at spacings indicated.

1. Single-Layer Construction: Space studs 16 inches (406 mm) o.c., unless otherwise indicated.
2. Multilayer Construction: Space studs 24 inches (610 mm) o.c., unless otherwise indicated.

E. Install steel studs so flanges point in the same direction and leading edge or end of each gypsum board panel can be attached to open (unsupported) edges of stud flanges first.

F. For curved partitions, install steel framing as follows:

1. Cut top and bottom runners through leg and web at 2-inch (50-mm) intervals for arc length. In cutting lengths of runners, allow for uncut straight lengths of not less than 12 inches (300 mm) at ends of arcs.
2. Bend runners to uniform curve of radius indicated and locate straight lengths so they are tangent to arcs.
3. Support outside (cut) leg of runners by clinching a 1-inch- (25-mm-) high-by-0.0209-inch- (0.55-mm-) thick steel sheet strip to inside of cut legs using metal lock fasteners.
4. Attach runners to structural elements at floor and ceiling with fasteners located 2 inches (50 mm) from ends and spaced 24 inches (610 mm) o.c.
5. Attach runners to suspended ceilings with toggle bolts or hollow wall anchors located 2 inches (50 mm) from ends and spaced 16 inches (406 mm) o.c. in between where attached to suspended ceilings.
6. Position studs vertically with open sides facing in same direction and engaging floor and ceiling runners. Begin and end each arc with a stud and space intermediate studs equally along arcs at stud spacing recommended by gypsum board manufacturer for radii indicated. Attach studs to runners with 3/8-inch- (9.5-mm-) long pan head framing screws. On straight lengths at ends of arcs, place studs 6 inches (150 mm) o.c. with last stud left free standing.

H. Frame door openings to comply with GA-219, and with applicable published recommendations of gypsum board manufacturer, unless otherwise indicated. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

1. Install 2 studs at each jamb, unless otherwise indicated.
2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (12.7-mm) clearance from jamb stud to allow for installation of control joint.
3. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.

I. Frame openings other than door openings to comply with details indicated or, if none indicated, as required for door openings. Install framing below sills of openings to match framing required above door heads.

J. Install thermal insulation as follows:

1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (600 mm) o.c.

3.6 FIELD QUALITY CONTROL

A. Above-Ceiling Observation: Architect will conduct an above-ceiling observation prior to installation of gypsum board ceilings and report any deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.

1. Notify Architect one week in advance of the date and the time when the Project, or part of the Project, will be ready for an above-ceiling observation.
2. Prior to notifying Architect, complete the following in areas to receive gypsum board ceilings:

    a. Installation of 80 percent of lighting fixtures, powered for operation.
    b. Installation, insulation, and leak and pressure testing of water piping systems.
    c. Installation of air duct systems.
    d. Installation of air devices.
    e. Installation of mechanical system control air tubing.
    f. Installation of ceiling support framing.

END OF SECTION 09255

SECTION 09260

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal stud wall framing.

B. Metal channel ceiling framing.

C. Shaft wall system.

D. Acoustic insulation.

E. Cementitious backer board.

F. Gypsum wallboard.

G. Glass mat faced gypsum board.

H. Joint treatment and accessories.

I. Textured finish system.

1.02 RELATED SECTIONS

A. Section 05400 - Cold Formed Metal Framing: Exterior wind-load-bearing metal stud framing.

B. Section 06100 - Rough Carpentry: Wood blocking product and execution requirements.

C. Section 07212 - Board and Batt Insulation: Acoustic insulation.

D. Section 07900 - Joint Sealers: Acoustic sealant.

1.03 REFERENCES

A. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)

B. AISI SG-971 - Specification for the Design of Cold-Formed Steel Structural Members; 1996, with 2000 Supplement.

C. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 1999 (R2005).

D. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (R2005).

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; 2006a.

F. ASTM C 475/C 475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2002.

G. ASTM C 645 - Standard Specification for Nonstructural Steel Framing Members; 2007.

H. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2006.

I. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2004.

J. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board; 2007.

K. ASTM C 954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2004.

L. ASTM C 1002 - 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; 2004.

M. ASTM C 1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2005.

N. ASTM C 1177/C 1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2006.

O. ASTM C 1396/C 1396M - Standard Specification for Gypsum Board; 2006a.

P. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2000 (Reapproved 2005).

Q. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction; 2005.

R. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2007.

S. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2004.

T. ASTM E 413 - Classification for Rating Sound Insulation; 2004.

U. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2007.

V. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association; 1996.

W. GA-600 - Fire Resistance Design Manual; Gypsum Association; 2006.

X. ICC (IBC) - International Building Code; 2006.

Y. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SYSTEM DESCRIPTION

A. Acoustic Attenuation for Interior Partitions Indicated as Acoustic: STC of see drawings calculated in accordance with ASTM E 413, based on tests conducted in accordance with ASTM E 90.

B. Shaft Wall: Configure and install components as required to achieve the following performance levels:
   1. Air Pressure Within Shaft: Intermittent loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.
   2. Acoustic Attenuation: STC of see drawings calculated in accordance with ASTM E 413, based on tests conducted in accordance with ASTM E 90.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.

C. Product Data: Provide data on metal framing, gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.

D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

E. Test Reports: For all stud framing products that do not comply with ASTM C 645 or C 754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.06 QUALITY ASSURANCE

A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.

B. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 3 years of documented experience.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated assemblies as indicated on drawings.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C 840 and GA-216.
   1. See PART 3 for finishing requirements.

B. Interior Partitions listed in the Partition Type Schedule: Provide completed assemblies with the following characteristics:
   1. Acoustic Attenuation: STC as indicated calculated in accordance with ASTM E 413, based on tests conducted in accordance with ASTM E 90.

C. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
   1. Air Pressure Within Shaft: Sustained loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.
   2. Acoustic Attenuation: STC of listed in the Partition Type Schedule calculated in accordance with ASTM E 413, based on tests conducted in accordance with ASTM E 90.

D. Shaft Walls at Elevator Shafts: Provide completed assemblies with the following characteristics:
   1. Air Pressure Within Shaft: Intermittent loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.
   2. Acoustic Attenuation: STC of listed in the Partition Type Schedule calculated in accordance with ASTM E 413, based on tests conducted in accordance with ASTM E 90.

E. Fire Rated Assemblies: Provide completed assemblies for the fire rating listed in the Partition Type Schedule
   1. ICC IBC Item Numbers: Comply with applicable requirements of ICC IBC for the particular assembly.
   2. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
   3. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL Fire Resistance Directory.

2.02 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. Clark Western Building Systems: www.clarkwestern.com.
   2. Dietrich Metal Framing: www.dietrichindustries.com.
   3. Marino-Ware: www.marinoware.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
   1. Exception: The minimum metal thickness and section properties requirements of ASTM C 645 are waived provided steel of 40 ksi minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E 72 using assemblies specified by ASTM C 754.
      a. Acceptable Products:
         1) Dietrich Metal Framing UltraSteel(tm): www.dietrichindustries.com.
   2. Studs: "C" shaped with flat or formed webs with knurled faces.
   3. Runners: U shaped, sized to match studs.
   4. Ceiling Channels: C shaped.
   5. Furring: Hat-shaped sections, minimum depth of 7/8 inch.

C. Loadbearing Studs for Application of Gypsum Board: As specified in Section 05400.

D. Shaft Wall Studs and Accessories: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 and specified performance requirements.

E. Ceiling Hangers: Type and size as specified in ASTM C 754 for spacing required.

F. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
   2. Material: ASTM A 653/A 653M steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.
   3. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems indicated on drawings.
   4. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet.

2.03 GYPSUM BOARD MATERIALS

A. Manufacturers:
   1. G-P Gypsum Corporation: www.gp.com/gypsum.
   2. National Gypsum Company: www.nationalgypsum.com.
   3. USG: www.usg.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Gypsum Wallboard: ASTM C 1396/C 1396M. Sizes to minimize joints in place; ends square cut.
   1. Regular Type:
      a. Application: Use for vertical surfaces, unless otherwise indicated.
      b. Thickness: 1/2 inch, 5/8 inch, as indicated.
      c. Edges: Tapered.
   2. Fire Resistant Type: Complying with Type X requirements; UL or WH rated.
      a. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X.
      b. Application: Where required for fire-rated assemblies, unless otherwise indicated.
      c. Thickness: 1/2 inch, 5/8 inch, as indicated.
      d. Edges: Tapered.

3. Ceiling Board: Special sag-resistant type.
    a. Application: Ceilings, unless otherwise indicated.
    b. Thickness: 1/2 inch.
    c. Edges: Tapered.

C. Water-Resistant Gypsum Backing Board: ASTM C 1396/C 1396M; ends square cut.
1. Application: Vertical surfaces behind thinset tile, except in wet areas.
2. Core Type: Regular and Type X, as indicated.
3. Thickness: 1/2 inch, 5/8 inch, as indicated.
4. Edges: Tapered.

D. Exterior Gypsum Soffit Board: ASTM C 1396/C 1396M; sizes to minimize joints in place; ends square cut.
1. Application: Ceilings and soffits in protected exterior areas, unless otherwise indicated.
2. Core Type: Regular and Type X, as indicated.
3. Thickness: 1/2 inch, 5/8 inch, as indicated.
4. Edges: Tapered.

E. Gypsum Shaftwall or Coreboard: ASTM C 1396/C 1396M; Type X core; sizes to minimize joints in place; 1 inch thick; square, tongue and groove, or double beveled edges, ends square cut.

2.04 FIBERGLASS REINFORCED BOARD MATERIALS

A. Cementitious Backer Board: ANSI A118.9, aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces, 1/2 inch thick.

B. Glass Mat Gypsum Board: Gypsum panels with moisture-resistant core and coated inorganic fiberglass mat back surface designed to resist growth of mold and mildew, per ASTM D 3273.
1. Glass Mat Board: Comply with performance requirements of ASTM C 1396/C 1396M for water-resistant gypsum backing board and ASTM C 1177/C 1177M for sheathing; tapered long edges.
    a. Product: DensGlass Gold manufactured by G-P Gypsum Corporation.
    b. Fire-Resistant Type: Type X core, thickness 5/8 inch.

2.05 ACCESSORIES

A. Acoustic Insulation: ASTM C 665; preformed glass fiber, friction fit type, unfaced.

B. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.

C. Finishing Accessories: ASTM C 1047, galvanized steel or rolled zinc, unless otherwise indicated.
1. Types: As detailed or required for finished appearance.
2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.

D. Joint Materials: ASTM C 475 and as recommended by gypsum board manufacturer for project conditions.
1. Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
2. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
3. Ready-mixed vinyl-based joint compound.
4. Chemical hardening type compound.

E. Textured Finish Materials: Latex-based compound; plain.

F. Screws: ASTM C 1002; self-piercing tapping type; cadmium-plated for exterior locations.

G. Screws: ASTM C 954; steel drill screws for application of gypsum board to loadbearing steel studs.

H. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 SHAFT WALL INSTALLATION

A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
   1. Install studs at spacing required to meet performance requirements.

B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.
   1. On walls over sixteen feet high, screw-attach studs to runners top and bottom.
   2. Seal perimeter of shaft wall and penetrations with acoustical sealant.

3.03 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C 754 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as permitted by standard.
   1. Level ceiling system to a tolerance of 1/1200.
   2. Install bracing as required at exterior locations to resist wind uplift.
   3. Where steel stud framing is not indicated on the drawings and/or horizontal spans do not allow the use of steel stud framing economically and/or other building components above a ceiling would benefit without a steel stud framing system for a ceilng system, then provide USG Drywall Suspension System "DGLW" (heavy-duty) complying wiht fire ratings indicated.

C. Studs: Space studs as scheduled.
   1. Extend partition framing to structure in all locations.
   2. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

E. Standard Wall Furring: Install at masonry walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
   1. Orientation: Horizontal.
   2. Spacing: As indicated.

F. Acoustic Furring: Install resilient channels at maximum 24 inches on center. Locate joints over framing members.

G. Furring for Fire Ratings: Install as required for fire resistance ratings indicated and to GA-600 requirements.

H. Blocking: Install blocking for support of plumbing fixtures and toilet partitions. Comply with Section 06114 for wood blocking.

3.04 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
   1. Place one bead continuously on substrate before installation of perimeter framing members.
   2. Place continuous bead at perimeter of each layer of gypsum board.
   3. In non-fire-rated construction, seal around all penetrations by conduit, pipe, ducts, and rough-in boxes.

3.05 GYPSUM BOARD AND GLASS MAT FACED BOARD INSTALLATION

A. Comply with ASTM C 840. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

D. Gypsum Soffit Board: Install perpendicular to framing, with staggered end joints over framing members or other solid backing.

E. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

F. Glass Mat Faced Gypsum Board: Install in strict accordance with manufacturer's instructions.

G. Installation on Metal Framing: Use screws for attachment of all gypsum board.

H. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For non-rated assemblies, install as follows:
   1. Single-Layer Applications: Screw attachment.

I. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

J. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board and exterior gypsum soffit board with sealant.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
   2. At exterior soffits, not more than 30 feet apart in both directions.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.07 JOINT TREATMENT

A. Glass Mat Faced Gypsum Board: Use fiberglass joint tape, bedded and finished with chemical hardening type joint compound.

B. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

C. Finish all gypsum board in accordance with ASTM C 840 Level 4.

D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.
   2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
   3. Taping, filling and sanding is not required at base layer of double layer applications.

E. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.08 TEXTURE FINISH

A. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.

3.09 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.10 PARTITION IDENTIFICATION

A. Fire rated corridor partitions, smoke stop partitions, horizontal exit partitions, exit enclosures and fire walls shall be effectively and permanently identified with signs or stenciling in a manner acceptable to the authority having jurisdiction. Such identification shall be 12-inches to the bottom of the wording above a decorative ceiling and in concealed spaces. Suggested wording shall be "FIRE AND SMOKE BARRIER - PROTECT ALL OPENINGS" in 4-inch high Stencil font red lettering spaced a minimum of 12-feet apart and at every wall penetration (which ever on occurs first).

3.11 FINISH LEVEL SCHEDULE

A. Level 1: Above finished ceilings concealed from view.

B. Level 2: Utility areas and areas behind cabinetry.

C. Level 3: Walls scheduled to receive textured wall finish.

D. Level 4: Walls and ceilings scheduled to receive flat or eggshell paint finish.

E. Level 5: Walls and ceilings scheduled to receive semi-gloss or gloss paint finish.

END OF SECTION

SECTION 09300

TILE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Includes materials and installation of floor tile, tile bases, wall tile and accessible shower receptor.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-In-Place Concrete: Concrete slab as substrate for tile flooring.

B. Section 07920 - Sealants and Caulking: Sealing expansion and control joints in floors.

C. Section 09250 - Gypsum Wallboard: Substrate for wall tile.

D. Section 10800 - Toilet and Bath Accessories: Coordination of tile installation with the installation of the toilet and hath accessories.

1.03 QUALITY ASSURANCE

A. Acceptable Manufacturers - the following manufacturers are acceptable for use on this project subject to compliance with project requirements:
   1. American Glean Tile Company
   2. Dal-Tile Corporation
   3. American Marrazzi Tile, Inc
   4. Florida Tile Division of Sikes Corporation

B. Publications: A copy of the following standards shall be kept on the job by the Contractor at all times: USAS 137.1, American National Standards Institute (ANSI) Standard Specifications; Latest Edition of Handbook for Ceramic Tile Installation by the Tile Council of America. These standards shall be referred to for tile installation.

C. Floor tile shall comply with the slip resistance requirements of the Americans With Disabilities Act (ADA).

D. Finish Flooring Materials Application Over Gypsum Concrete Underlayment: Comply with Maxxon Corporation's "Procedures for Attaching Finished Floor Goods to Maxxon Underlayments" brochure for guidelines for installing finished floor goods.

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300:
   1. Copy of Master Grade Certificate bearing certification mark of Tile Council of America, signed by both tile manufacturer and tile sub-contractor,
   2. Adhesive manufacturers Certification of Compliance to required standard.
   3. Sample panel, approximately 12" square for each color, pattern and type of tile intended to be used. Samples shall include all tile accessories. Panels shall be properly labeled on back with names of project, product and contractor. Samples shall show limit of range to be expected on the tile installation.
   4. Sample marble threshold showing color, markings and finish.

B. Obtain approval of sample submittals before delivering any products to job site.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver all products to job site in manufacturer's unopened, original, standard containers with grade seals unbroken and labels intact. Keep tile cartons dry.

1.06 EXTRA STOCK

A. Supply extra 2% replacement stock of each type tile installed. Deliver to Owner in manufacturer's original cartons with labels intact. All unused stock shall also be turned over to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

A. Tile: All tile colors as selected by Architect.
   1. Floor Tile - Guestroom Baths: Pal-Tile 12"x12" Porcelain Tile, matte glazed, eased edges.
   2. Base - Guestroom Baths: 3"x12" long, match floor tile.
   3. Floor Tile - Pantry Serving Areas, Lobby Entrance, Elevators, Secondary Entrance: Pal-Tile 18"xl8"x3/8" Porcelain Tile #PVO3, matte glazed, eased edges.
   4. Base - Pantry Serving Areas, Lobby Entrance, Secondary Entrance: 3"xl/8" long. match floor tile.
   5. Floor Tile - Public Restrooms: Dal-Tile 18"xl8"x3/8" Porcelain Tile #PVO3, matte glazed, eased edges.
   6. Base - Public Restrooms: 3"xl8" long, match floor tile.
   7. Floor Tile - Employee Toilets: 6 "x6" Mat glazed porcelain tile, eased edges.
   8. Base - Employee Toilet: 6"x3" High, match floor tile
   9. Walls - Employee Toilet: 12"x12", Smooth surface ceramic tile, cushion edge, glazed finish.
   10. Vending and Prep Area Floor tile: Quarry tile. 12"x12" American-Glean Quarry Naturals.
   11. Vending and Prep Area Base: Quarry tile, 5"x12", coved, round top, match floor tile.

B. Provide all miscellaneous shapes, special shapes, including bullnoses, necessary for a complete installation. All external corners shall be bullnosed (unless specified/indicated otherwise), internal corners shall be square.

C. Provide solid brass edging at termination of floor tile where tile butts carpet.

D. Setting Materials for Thin-Set Installation of Tile, Except as Otherwise Specified:
   1. Floor Tile:
      a. Mortar: Factory prepared mix conforming with ANSI A 118.1, similar to Bostik Tile-Mate.
      b. Where tile is installed over gypsum concrete, provide Bostik Hydroment Ultra-Set membrane between the tile and the gypsum concrete.
      c. Grout - All Areas Except as Otherwise Specified: Latex Portland cement, similar to Bostik Sanded Hydroment Grout for joints wider than 1/8'' and Bostik Non-Sanded Hydroment Dry tile Grout for joint width 1/8-inch and less, color(s) as selected by the Architect. Each type of grout shall have Bostik Hydroment Multi-Purpose Acrylic Latex Additive #425 added to the grout mix.
      d. Grout for Guestroom Bath, Public Areas, Prep and Pantry: Laticrete 210 Epoxy Grout System as manufactured by Laticrete International, of Woodbridge. Connecticut. Color admixture(s) as selected by the Architect.
   2. Wall Tile:
      a. Adhesive: Water-resistant, organic complying with ANSI 136.1, type 1, similar to Bostik 500 Multi-Purpose Ceramic Tile Adhesive. Provide primer and sealer as recommended by the adhesive manufacturer.
      b. Grout: Latex Portland cement, color(s) as selected.

E. Slip Sheet - All Installations at Slab-Over-Grade: A sheet membrane product specifically manufactured for installation between concrete slab-on-grade and tile floors, the purpose of which is to protect the tile from cracking should the slab below crack. Liquid-applied products will not be considered.
   1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:
      a. Strataflex anti-fracture membrane; National Applied Construction Products, Inc. of Canal Fulton, Ohio.
      b. Nobleseal CIS crack isolation sheet; The Noble Company of Grand Haven, Michigan.
   2. Primer: As required by the slip sheet manufacturer.

F. Leveling Coat: Leveling coat shall be 1/4" thick or less and shall consist of dry set mortar to which an equal volume of a mixture of one (1) part Portland cement and 1-1/2 parts sand has been added.

G. Materials for Construction of Accessible Shower Receptor
   1. Portland Cement: ASTM C-15O Type I
   2. Sand: ASTMC-144
   3. Mortar: 1 part Portland cement, 4 parts damp sand by volume. Use an admixture to make mortar bed water resistant.
   4. Reinforcing at Receptor: 2" x 2" x 16/16 gauge wire mesh.
   5. Shower Pan: "Cormposeal"
   6. Waterproofing Membrane for Walls: Laticrete 9235 Waterproof Membrane.
   7. Grout: Laticrete 210 Epoxy Grout System as manufactured by Laticrete International, of Woodbridge, Connecticut. Color admixture(s) as selected by the Architect.

H. Sealant for application around perimeter of plumbing fixtures (waterclosets, urinals, tubs. etc.), between tile and another material, shall he white, fungicidal one-part silicone rubber sealant comparable to Dow Coining 782 or 784.

I. Refer to Section 07920 for sealant for use in floor tile control/expansion joints.

J. Thresholds shall be Grade A Georgia Marble, thickness required to make transition between tile and adjoining surfaces, and shall comply with ASTM C-503, for exterior use and abrasion resistance. Thresholds shall he free from cracks, chips, stains or other defects, uniform in tone and coloring. Color(s) as scheduled.

PART 3 EXECUTION

3.01 PREPARATION

A. All surfaces receiving tile shall be dry, clean, free from oily or waxy films. Do not start work until all grounds, anchors, hangers, electrical and mechanical work in or behind the tile have been installed. Inspect sub-floors which are to receive tile covering. Correct defects or conditions that will interfere with or prevent a satisfactory tile installation. Do not proceed with installation until such defects or conditions have been corrected. The starting of installation work in a room or space shall imply acceptance of the surfaces to receive the tile in that space.

B. Do not install any materials until temperature of materials and substructures have been maintained at or above 50ºF minimum for a period of 24 hours.

3.02 INSTALLATION - GENERAL

A. Where possible, lay out work so that no tile less than half-size occurs. For heights stated in feet and inches, maintain full courses to produce nearest attainable heights without cutting tile. Obtain exact locations of expansion joints and accessories before installing tile.

B. Marble thresholds shall be installed at each door opening where tile begins. Install each threshold in a bed of mortar and set as indicated on the Drawings. One piece of marble will be used for each threshold, Notch thresholds at door jambs to follow profile of door frame.

C. After tile work and grout is dry, apply continuous sealant in tile control joints at perimeter of waterclosets and urinals, where tile butts tubs, ceilings and other materials.

D. As the work progresses, all surfaces shall be cleaned with burlap. Upon completion scrub the entire installation with fiber brushes and water. Do not use acid or metal scrapers. Before traffic is permitted over finished tile work, cover the floors with untreated building paper or board walkways. Cracked, broken or damaged tiles shall be removed and replaced prior to final inspection.

3.03 TILE INSTALLATION

A. Comply with the following from Tile Council of America Handbook Standards
   1. Floors, interior, concrete:
      a. F113; Dry-set Mortar or Latex-Portland Cement Mortar.
      b. F115; Dry-set Mortar, Epoxy Grout.
      c. Floors, Interior, Concrete, Epoxy Mortar and Grout: F131; Epoxy Mortar and Grout.
   2. Walls
      a. Interior Concrete: W202; Dry-set Mortar or Latex-Portland Cement Mortar.
      b. Walls, Gypsum Backer Units: W243; Dry-set Mortar or Latex-Portland Cement Mortar.
   3. Accessible Shower Receptor: B420; Reinforced mortar bed.
   4. Expansion Joints, Vertical and Horizontal: EJ171; Joint Design Essentials.
   5. Thresholds, Saddles: TR611.

3.04 FLOOR CONTROL/EXPANSION JOINTS

A. Floor tile shall be aligned to show uniform joints and then allowed to set until firm. Tile shall be set with all joints in alignment and shall he uniform and true, maintained straight from wall to wall, uniform in width for entire length of wall in either direction.

B. Provide expansion and control joints over control and expansion joints in substrate (floors). Provide expansion joint at tile perimeter abutting walls. Consult with Architect before constructing any control and expansions joints for location verification. Expansion or control joints shall he 1/4-inch wide, through the tile and bed, shall he provided and constructed as recommended by the Tile Council of America, Inc., as specified hereinbefore.
   1. Joints shall he sealed with sealant not less than 1/4-inch deep.

3.05 REPAIR

A. Any loose, uneven or misaligned tile shall be removed and reinstalled at no additional expense to the Owner.

3.06 CLEANUP AND PROTECTION

A. Remove all excess materials and debris from the job site. Leave entire work in a neat condition ready for final inspection.

B. Protect the completed installations of the tile from damage until the date of Substantial Completion. Any tile damaged during this period of time shall he replaced at no expense to the Owner.

END OF SECTION

SECTION 09310

DETECTABLE WARNING SURFACE TILE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Special Conditions and Division 1 Specifications Section, apply to this Section.

B. Section 02765 - Pavement Markings.

1.02 DESCRIPTION

A. This Section specifies furnishing and installing cast-in-place tactile tile modules where indicated or not indicated but are not limited to, the following locations:
   1. Accessible curb ramps that connect to a cross walk adjoining a vehicular way including the accessible parking stall aisles' curb ramp. Tactile tile shall start six to eight inches back from the projected edge of the curb/gutter' intersection of the vehicular way up the curb ramp a distance of 36-inches for the width of the ramp but no less than 36-inches wide whichever is the greater distance. Flared sides of the ramp are not required to have tactile tile. Tactile tile shall be perpendicular to the curb's projected edge.
      a. Curb ramps that have a landing prior to a vehicular way are not required to have tactile tile in the ramp but the landing's edge adjacent to the vehicular way will require tactile tile.
   2. Any accessible walking surfaces that are not separated by curbs, railings or other elements between pedestrian areas and vehicular areas, including hazardous vehicular areas, medians/islands, landings of ramps at the vehicular way and rail systems, the boundary between the areas shall be defined by a continuous tactile tile which is 36 in wide.
   3. The edges of reflecting pools where the edges are not protected by railings, walls and curbs shall be defined by a continuous tactile tile which is 36 in wide.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer’s literature describing products, installation procedures and routine maintenance.

B. Samples for Verification Purposes: Submit two (2) tile samples minimum 6"x8" of the kind proposed for use.

C. Shop drawings are required for products specified showing fabrication details; composite structural system; plans of tile placement including joints, and material to be used as well as outlining installation materials and procedure.

D. Material Test Reports: Submit test reports from qualified independent testing laboratory indicating that materials proposed for use are in compliance with requirements and meet the properties indicated. All test reports shall be conducted on a cast-in-place tactile tile system as certified by a qualified independent testing laboratory.

1.04 QUALITY ASSURANCE

A. Maintenance Instructions: Submit copies of manufacturer's specified maintenance practices for each type of tactile tile and accessory as required.

B. Provide cast-in-place tactile tiles and accessories as produced by a single manufacturer.

C. Installer's Qualifications: Engage an experienced Installer certified in writing by tactile manufacturer as qualified for installation, who has successfully completed tile installations similar in material, design, and extent to that indicated for Project.

D. Americans with Disabilities Act (ADA): Provide tactile warning surfaces which comply with the detectable warnings on walking surfaces section of the Americans with Disabilities Act (Title 49 CFR TRANSPORTATION, Part 37.9 STANDARDS FOR ACCESSIBLE TRANSPORTATION FACILITIES, Appendix A, Section 4.29.2 DETECTABLE WARNINGS ON WALKING SURFACES.

E. Vitrified Polymer Composite (VPC) cast-in-place tiles shall be an epoxy polymer composition with an ultra violet stabilized coating employing aluminum oxide particles in the truncated domes. The tile shall incorporate an in-line dome pattern of truncated domes 0.2" in height, 0.9" diameter at the base, and 0.4" diameter at top of dome spaced 2.35" nominal as measured on a diagonal and 1.70" nominal as measured side by side. For wheelchair safety the field area shall consist of a non-slip surface with a minimum of 40 - 90° raised points 0.045" high, per square inch; "Armor-Tile" as manufactured by Engineered Plastics Inc., Tel: 800-682-2525, or approved equal.
   1. Dimensions: Tiles shall be held within the following dimensions and tolerances:
      a. Nominal Tile Size Length and Width: 24"x36"
      b. Depth 1.400" ± 5% max.
      c. Face Thickness 0.1875 ± 5% max.
      d. Warpage of Edge ± 0.5% max.
   2. Water Absorption of Tile when tested by ASTM-D 570 not to exceed 0.35%.
   3. Slip Resistance of Tile when tested by ASTM-C 1028 the combined wet/dry static co-efficient of friction not to be less than 0.80 on top of domes and field area.
   4. Compressive Strength of tile when tested by ASTM-D 695-91 not to be less than 18,000 psi.
   5. Tensile Strength of Tile when tested by ASTM-D 638-91 not to be less than 10,000 psi.
   6. Flexural Strength of Tile when tested by ASTM - C293-94 not to be less than 24,000 psi.
   7. Chemical Stain Resistance of Tile when tested by ASTM-D 543-87 to withstand without discoloration or staining - 1% hydrochloric acid, urine, calcium chloride, stamp pad ink, gum and red aerosol paint.
   8. Abrasive Wear of Tile when tested by BYK - Gardner Tester ASTM-D 2486* with reciprocating linear motion of 37± cycles per minute over a 10" travel. The abrasive medium, a 40 grit Norton Metallite sand paper, to be fixed and leveled to a holder. The combined mass of the sled, weight and wood block to be 3.2 lb. Average wear depth shall not exceed 0.030 after 1000 abrasion cycles measured on the top surface of the dome representing the average of three measurement locations per sample.
   9. Fire Resistance: When tested to ASTM E84 flame spread be less than 25.
   10. Gardner Impact to geometry "GE" of the standard when tested by ASTM-D 5420-93 to have a mean failure energy expressed as a function of specimen thickness of not less than 450 in. lbf/in. A failure is noted if a hairline fracture is visible in the specimen.
   11. Accelerated Weathering of Tile when tested by ASTM-G26-95 for 2000 hours shall exhibit the following result - no deterioration, fading or chalking of surface of tile.

F. Vitrified Polymer Composite (VPC) Cast-In-Place Tiles embedded in concrete shall meet or exceed the following test criteria:
   1. Accelerated Aging and Freeze Thaw Test of Tile when tested to ASTM-D 1037 shall show no evidence of cracking, delamination, warpage, checking, blistering, color change, loosening of tiles or other defects.
   2. Salt and Spray Performance of Tile and Adhesive System when tested to ASTM-B 117 not to show any deterioration or other defects after 100 hours of exposure.

G. Embedment flange spacing shall be 3.0" minimum to 3.1" maximum center to center spacing as illustrated on product drawing.

1.05 DELIVERY, STORAGE AND HANDLING

A. Tiles shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy wrappings, and tile type shall be identified by part number.

B. Tiles shall be delivered to location at building site for storage prior to installation.

1.06 SITE CONDITIONS

A. Environmental Conditions and Protection: Maintain minimum temperature of 40 degrees F in spaces to receive tactile tiles for at least 48 hours prior to installations, during installation, and for not less than 48 hours after installation. Store tactile tiles material in spaces where they will be installed for at least 48 hours before beginning installation. Subsequently, maintain minimum temperature of 40 degrees F in areas where work is completed.

B. The use of water for work, cleaning or dust control, etc. shall be in contained and controlled and shall not be allowed to come into contact with the passengers or public. Provide barricades or screens to protect passengers or public.

C. Disposal of any liquids or other materials of possible contamination shall be made in accordance with federal state and local laws and ordinances.

D. Cleaning materials shall have code acceptable low VOC solvent content and low flammability if used on the site.

1.07 EXTRA STOCK

A. Deliver extra stock to warehouse designated by the engineer. Furnish new materials from same manufactured lot as materials installed and enclose in protective packaging with appropriate identification. Furnish not less than two (2)% of the supplied materials for each type, color and pattern installed.

1.08 GUARANTEE

A. Cast-in-place tactile tiles shall be guaranteed in writing for a period of five years from date of final completion. The guarantee includes defective work, breakage, deformation, and loosening of tiles.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

B. The Vitrified Polymer Composite (VPC) Cast-In-Place Tactile Tile specified is based on Armor-Tile manufactured by Engineered Plastics Inc. (800-682-2525). Existing engineered and field tested products which are subject to compliance with requirements, may be incorporated in the work and shall meet or exceed the specified test criteria and characteristics.
   1. Color: Yellow conforming to Federal Color No. 33538. Color shall be homogeneous throughout the tile.
   2. Tiles are also available in Light Grey, Dark Grey, Onyx Black, Pearl White, Brick Red.
   3. Color to be selected by the Architect.

2.02 MATERIALS

A. Heavy-duty elastomeric polyurethane adhesive as manufactured by Boiardi, Mapei, Bostik or approved equal.

B. Heavy-duty elastomeric polyurethane sealant as manufactured by Boiardi, Mapei, Bostik or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. During tile installation procedures ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.

B. The specifications of the structural adhesives, fasteners, and related materials shall be in strict accordance with the contract documents and the guidelines set by their respective manufacturers.

C. The physical characteristics of the concrete shall be consistent with the contract specifications while maintaining a slump range of 4 7 to permit solid placement of the Cast-In-Place Tile System. An overly wet mix will cause the Cast-In-Place System to float. Under these conditions, suitable weights such as 2 concrete blocks or sandbags (25 lb) shall be placed on each tile.

D. Prior to placement of the Cast-In-Place System, the contract drawings shall be reviewed.

E. The concrete pouring and finishing operations require typical mason's tools, however, a 4' long level with electronic slope readout, 25 lb. weights, and a large non-marring rubber mallet are specific to the installation of the Cast-In-Place System. A vibrating mechanism such as that manufactured by Vibco can be employed, if desired. The vibrating unit should be fixed to a soft base such as wood, at least 1 foot square.

F. The factory-installed plastic sheeting must remain in place during the entire installation process, to prevent the splashing of concrete onto the finished surface of the tile.

G. When preparing to set the tile, it is important that NO concrete be removed in the area to accept the tile. It is imperative that the installation technique eliminates any air voids under the tile. Holes around the tile perimeter allow air to escape during the installation process. Concrete will flow through the large holes in each vane on the underside of the tile. This will lock the tile solidly into the cured concrete.

H. The concrete shall be poured and finished true and smooth to the required dimensions and slope prior to the tile placement. Immediately after finishing concrete, the electronic level should be used to check that the required slope is achieved. The tile shall be placed true and square to the curb edge in accordance with the contract drawings. The Cast-In-Place Tiles shall be tamped (or vibrated) into the fresh concrete to ensure that the field level of the tile is flush to the adjacent concrete surface. The contract drawings indicate that the tile field level (base of truncated dome) is flush to adjacent surfaces to permit proper water drainage and eliminate tripping hazards between adjacent finishes.

I. Immediately after tile placement, the tile elevation is to be checked to adjacent concrete. The tile elevation and slope should be set consistent with contract drawings to permit water drainage to curb as the design dictates.

J. While concrete is workable, a 3/8” radius edging tool shall be used to create a finished edge of concrete, then a steel trowel shall be used to float the concrete around the tile's perimeter, flush to the field level of tile.

K. During and after the tile installation and the concrete curing stage, it is imperative that there is no walking, leaning or external forces placed on the tile to rock the tile, causing a void between the underside of tile and concrete.

L. Following tile placement, review installation tolerances to contract drawings and adjust tile before the concrete sets. Two suitable weights of 25 lb each shall be placed on each tile as necessary to ensure solid contact of the underside of tile to concrete.

M. Following the curing of the concrete, protective plastic wrap is to be removed from the tile face by cutting the plastic with a sharp knife, tight to the concrete/tile interface. If concrete bled under the plastic, a soft wire brush will clean the residue without damage to the tile surface.

If desired, individual tiles can be bolted together using ¼ inch or equivalent hardware. This can help to ensure that adjacent tiles are flush to each other during the installation process. Tape or caulking can be placed on the underside of the bolted butt joint to ensure that concrete does not ooze up between the tiles during installation. Any protective plastic wrap which was peeled back to facilitate bolting or cutting, should be replaced and taped to ensure that the tile surface remains free of concrete during the installation process.

Tiles can be cut to custom sizes, or to make a radius, using a continuous rim diamond blade in a circular saw or mini-grinder. Use of a straightedge to guide the cut is advisable where appropriate.

Any sound-attenuating plates on the underside of the tile, which are dislodged during handling or cutting, should be replaced and secured with construction adhesive. The air gap created between these plates and the bottom of the tile is important, in preserving the detectability properties of the Armor-Tile System.

3.02 CLEANING AND PROTECTING

A. Protect tiles against damage during construction period to comply with guidance tile manufacturer's specification.

B. Protect tiles against damage from rolling loads following installation by covering with plywood or hardwood.

C. Clean guidance tiles not more than four days prior to date scheduled for inspection intended to establish date of substantial completion in each area of project. Clean tile by the method specified by the manufacturer.

--- END OF SECTION ---

SECTION 09511

SUSPENDED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

1.02 RELATED SECTIONS

A. Section 07900 - Joint Sealers: Acoustical sealant.

B. Section 08310 - Access Doors and Panels: Access panels.

C. Section 13851 - Fire Alarm System: Fire alarm components in ceiling system.

D. Section 13925 - Fire Suppression Sprinklers: Sprinkler heads in ceiling system.

E. Section 15850 - Air Outlets and Inlets: Air diffusion devices in ceiling.

F. Section 16510 - Interior Luminaires: Light fixtures in ceiling system.

G. Section 16821 - Public Address and Music Equipment: Speakers in ceiling system.

1.03 REFERENCES

A. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2004.

B. ASTM C 636/C 636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2006.

C. ASTM E 580/E 580M - Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint; 2006.

D. ASTM E 1264 - Standard Classification for Acoustical Ceiling Products; 1998 (Reapproved 2005).

E. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on suspension system components.

C. Samples: Submit two samples 6 x 6 inch in size illustrating material and finish of acoustical units.

D. Samples: Submit two samples each, 12 inches long, of suspension system main runner.

E. Manufacturer's Installation Instructions: Indicate special procedures.

1.05 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years experience.

B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years experience.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.07 PROJECT CONDITIONS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustical units after interior wet work is dry.

C. This project has Interior Design Drawings. The Contractor is to verify with the Interior Design Drawings prior to applying any of the following ceiling materials contained in Part 2 of the following Specification to the building's interior. Interior items addressed within this Specification that are not addressed in the Interior Design Documents shall be applicable to this Specification over the Interior Design Drawings.

1.08 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.

B. Provide 5 percent of total acoustical unit area of each type of acoustical unit for Owner's use in maintenance of project.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

A. Manufacturers:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Ceilings (formerly BPB): www.certainteed.com.
   3. USG: www.usg.com.
   4. Substitutions: Not permitted.

B. Acoustical Units - General: ASTM E 1264, Class A.

C. Acoustical Panels Type 1: Painted mineral fiber, ASTM E 1264 Type III, with the following characteristics:
   1. Size: 24 x 48 inches.
   2. Thickness: 5/8 inches.
   3. Density: 1.0 lb/cu ft.
   4. Light Reflectance: 0.83 percent, determined as specified in ASTM E 1264.
   5. NRC Range: 0.50 to 0.65, determined as specified in ASTM E 1264.
   6. Ceiling Attenuation Class (CAC):.35, determined as specified in ASTM E 1264.
   7. Edge: Reveal edge.
   8. Surface Color: White.
   9. Surface Pattern: Non-directional fissured.
   10. Product: #1775 Dune by Armstrong.
   11. Suspension System: Exposed grid Type 1.

D. Acoustical Panels Type 3: Vinyl faced mineral fiber, ASTM E 1264 Type IV, with the following characteristics:
   1. Size: 24 x 48 inches.
   2. Thickness: 5/8 inches.
   3. Surface Color: White.
   4. Surface Pattern: Non-directional fissured.

E. Acoustical Panels Type 2:.
   1. Size: 24 x 24 inches.
   2. Light Reflectance: 0.83 percent, determined as specified in ASTM E 1264.
   3. NRC Range: 0.10 to 0.20, determined as specified in ASTM E 1264.
   4. Ceiling Attenuation Class (CAC): 40, determined as specified in ASTM E 1264.
   5. Panel Edge: Square.
   6. Surface Color: White.
   7. Product: #868 Clean Room VL by Armstrong.
   8. Suspension System: Exposed grid Type 2.

2.02 SUSPENSION SYSTEM(S)

A. Manufacturers:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. Chicago Metallic Corporation: www.chicagometallic.com.
   3. USG: www.usg.com.
   4. Substitutions: Not permitted.

B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

C. Exposed Steel Suspension System Type 1: Formed galvanized steel, commercial quality cold rolled; intermediate-duty.
   1. Profile: Tee; 9/16 inch wide face.
   2. Construction: Double web.
   3. Finish: Backed polyester white finish.
   4. Product: Suprafine by Armstrong.

D. Exposed Steel Suspension System Type 2: Formed galvanized steel, commercial quality cold rolled; intermediate-duty.
   1. Profile: Tee; 15/16 inch wide face.
   2. Construction: Double web.
   3. Finish: Backed polyester white finish.
   4. Product: Prelude MX by Armstrong.

2.03 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Locate system on room axis according to reflected plan.

D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

E. 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 spliced, 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.

I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

J. Do not eccentrically load system or induce rotation of runners.

K. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Miter corners.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Lay directional patterned units with pattern parallel to longest room axis.

D. Fit border trim neatly against abutting surfaces.

E. Install units after above-ceiling work is complete.

F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

G. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.
   3. Double cut and field paint exposed reveal edges.

H. Where round obstructions occur, provide preformed closures to match perimeter molding.

I. Install hold-down clips on panels within 20 ft of an exterior door.

3.04 ERECTION TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09610

DETECTABLE GUIDANCE TILE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Special Conditions and Division 1 Specifications Section, apply to this Section.

B. Section 02765 - Pavement Markings.

1.02 DESCRIPTION

A. This Section specifies furnishing and installing surface applied Detectable Guidance Tiles where indicated or not indicated but are not limited to, the following locations:
   1. Accessible pedestrian crosswalks occuring at and crossing a vehicular way from one side to the other side of the vehicular way in a straight line of travel.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's literature describing products, installation procedures and routine maintenance.

B. Samples for Verification Purposes: Submit three (3) samples of full size surface applied detectable directional bar tiles of the kind proposed for use.

C. Shop drawings are required for products specified showing fabrication details; tile surface profile; structural flange locations; plans of tile placement including joints, and material to be used as well as outlining installation materials and procedure.

D. Material Test Reports: Submit test reports from qualified independent testing laboratory indicating that materials proposed for use are in compliance with requirements and meet the properties indicated.

E. Maintenance Instructions: Submit copies of manufacturer's specified maintenance practices for each type of tile and accessory as required.

F. The manufacturer shall provide a list of projects that successfully demonstrate the products durability and weathering capabilities.

1.04 QUALITY ASSURANCE

A. Provide surface applied Detectable Guidance Tiles and accessories as produced by a single manufacturer. The manufacturer shall have a minimum of two (2) years experience in the manufacture of Detectable Guidance Tiles.

B. Installer's Qualifications: Engage an experienced Installer certified in writing by tactile manufacturer as qualified for installation, who has successfully completed tile installations similar in material, design, and extent to that indicated for Project. Manufacturer's supervisor shall be present at all times during the installation of the Detectable Guidance Tiles.

C. Vitrified Polymer Composite (VPC) Detectable Guidance Tiles shall be an epoxy polymer composition employing aluminum oxide particles in the raised surface.
   1. Tile Dimensions: Nominal. 4" by 24", by 0.3125 inches thick: Tiles shall be formed with ¼" thick structural flanges which extend below the surface a minimum of 1".
   2. Water Absorption of Tile when tested by ASTM-D 570 not to exceed 0.35%.
   3. Slip Resistance of Tile when tested by ASTM-C 1028 the combined wet/dry static co-efficient of friction not to be less than 0.80.

4. Compressive Strength of tile when tested by ASTM-D 695-91 not to be less than 18,000 psi.
5. Tensile Strength of Tile when tested by ASTM-D 638-91 not to be less than 10,000 psi.
6. Flexural Strength of Tile when tested by ASTM - C293-94 not to be less than 24,000 psi.
7. Gardner Impact to geometry “GE” of the standard when tested by ASTM-D 5420-93 to have a mean failure energy expressed as a function of specimen thickness of not less than 450 in. lbf/in. A failure is noted if a hairline fracture is visible in the specimen
8. Chemical Stain Resistance of Tile when tested by ASTM-D 543-87 to withstand without discoloration or staining - 1% hydrochloric acid, urine, calcium chloride, stamp pad ink, gum and red aerosol paint..
9. Abrasive Wear of Tile when tested by BYK - Gardner Tester ASTM-D 2486* with reciprocating linear motion of 37 cycles per minute over a 10” travel. The abrasive medium, a 40 grit Norton Metallite sand paper, was fixed and leveled to a holder. The combined mass of the sled, weight and wood block is 3.2 lb. Average wear depth shall not exceed 0.030 after 1000 abrasion cycles measured on the top surface of the dome representing the average of three measurement locations per sample.
10. Fire Resistance: When tested to ASTM E84 flame spread shall be less than 25.
11. Accelerated Weathering of Tile when tested by ASTM-G26-95 for 2000 hours shall exhibit the following result - no deterioration, fading or chalking of surface of tile.

D. Vitrified Polymer Composite (VPC) Detectable Guidance Tiles adhered to concrete shall meet or exceed the following test criteria:
1. Accelerated Aging and Freeze Thaw Test of Tile and Adhesive System when tested to ASTM-D 1037 shall show no evidence of cracking, delamination, warpage, checking, blistering, color change, loosening of tiles or other defects.
2. Salt and Spray Performance of Tile and Adhesive System when tested to ASTM-B 117 not to show any deterioration or other defects after 100 hours of exposure.

1.05 DELIVERY, STORAGE AND HANDLING

A. Tiles shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy wrappings, and tile type shall be identified by part number.

B. Tiles shall be delivered to location at building site for storage prior to installation.

1.06 SITE CONDITIONS

A. Environmental Conditions and Protection: Maintain minimum temperature of 40 degrees F in spaces to receive tactile tiles for at least 48 hours prior to installations, during installation, and for not less than 48 hours after installation. Store tactile tiles material in spaces where they will be installed for at least 48 hours before beginning installation. Subsequently, maintain minimum temperature of 40 degrees F in areas where work is completed.

B. The use of water for work, cleaning or dust control, etc. shall be in contained and controlled and shall not be allowed to come into contact with the passengers or public. Provide barricades or screens to protect passengers or public.

C. Disposal of any liquids or other materials of possible contamination shall be made in accordance with federal state and local laws and ordinances.

D. Cleaning materials shall have code acceptable low VOC solvent content and low flammability if used on the site.

E. Contractor shall coordinate phasing and flagging personnel operations as specified elsewhere.

1.07 EXTRA STOCK

A. Deliver extra stock to warehouse designated by the engineer. Furnish new materials from same manufactured lot as materials installed and enclose in protective packaging with appropriate identification. Furnish not less than two (2)% of the supplied materials for each type, color and pattern installed.

1.08 GUARANTEE

A. Surface applied detectable guidance tiles shall be guaranteed in writing for a period of five years from date of final completion. The guarantee includes defective work, breakage, deformation, fading and chalking of finishes, and loosening of tiles.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

B. The Vitrified Polymer Composite (VPC) Surface Applied Detectable Guidance Tiles specified is based on Armor-Tile manufactured by Engineered Plastics Inc. (800-682-2525).
   1. Color: Yellow conforming to Federal Color No. 33538. Color shall be homogenous throughout the tile.

2.02 MATERIALS

A. Heavy-duty elastomeric polyurethane adhesive as manufactured by Boiardi, Mapei, Bostik or approved equal.

B. Heavy-duty elastomeric polyurethane sealant as manufactured by Boiardi, Mapei, Bostik or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. During all surface preparation and tile installation procedures ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.

B. The application of all adhesives and sealants shall be in strict accordance with the guidelines set by their respective manufacturers.

C. Throughout the installation phases of surface preparation and tile setting, ensure that care is taken to prevent damage to any work.

D. Lay out area to receive tile and mark with an indelible felt pen a reference grid for the tile to be laid.

E. Set the diamond bladed double headed wet saw to the appropriate depth of 1 ½ " x ¼" wide to achieve the necessary parallel grooves in the area to receive the Detectable Guidance Tile.

F. After saw cutting has been completed, the surface is to be vacuumed and power washed with clean clear water, free from all dirt and debris. Visually inspect all surfaces for obtrusions or foreign matter. If obtrusions are present, promptly grind away.

G. Immediately prior to installing the surface applied Detectable Guidance Tiles, all surfaces must be inspected to ensure that they are clean, dry, free of voids, curing compounds, projections, loose material, dust, oils, grease, sealers and determined to be structurally sound before the application of the setting adhesive. The setting adhesive requires that the substrate and the ambient temperature are 40 degrees F minimum.

H. Spread the adhesive to provide complete coverage in the grooves and over the surface, using a clean, well-maintained ¼ " x ¼ " V notch trowel.

I. Inspect the tile and clean with acetone all dust and other contaminants from the surfaces to be adhered, then set the tile in place, true and square

J. All subsequent tiles are set following the same procedures as outlined in H and I. A gap of 3/16" allowed between tiles for expansion and contraction is mandatory.

K. Following the installation of the tiles, the urethane sealant system color matched to the adjacent surface should be applied to the joint between abutting tiles and between tiles and adjacent surface. Follow the manufacturer's recommendations when mixing or applying the sealant system and ensure that the joint is clean and free of debris, and any excess adhesive is cut away to provide sufficient depth for the sealant in the saw cut in accordance with the contract drawings.

L. After the area has been fully tiled and sealant system applied, the tile surface shall be cleaned, following the recommended maintenance and cleaning procedures.

3.02 CLEANING AND PROTECTING

A. Protect tiles against damage during construction period to comply with guidance tile manufacturer's specification.

B. Clean guidance tiles not more than four days prior to date scheduled for inspection intended to establish date of substantial completion in each area of project. Clean tile by the method specified by the manufacturer.

END OF SECTION

SECTION 09650

RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

C. Installation accessories.

1.02 RELATED SECTIONS

A. Section 03505 - Self-Leveling Underlayment.

1.03 REFERENCES

A. ASTM F 710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2005.

B. ASTM F 1066 - Standard Specification for Vinyl Composition Floor Tile; 2004.

C. ASTM F 1861 - Standard Specification for Resilient Wall Base; 2002.

D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; National Fire Protection Association; 2006.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.06 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.

B. Provide 200 sq ft of flooring, 20 lineal feet of base, and 5 percent of installed stair materials of each type and color specified.

PART 2 PRODUCTS

2.01 MATERIALS - TILE FLOORING

A. Vinyl Composition Tile: Homogeneous, with color extending throughout thickness, and:
   1. Minimum Requirements: Comply with ASTM F 1066, of Class corresponding to type specified.
   2. Size: 12 x 12 inch.
   3. Thickness: 0.125 inch.
   4. Pattern: As indicated on the drawings or directed by the Architect.
   5. Manufacturers:
      a. Armstrong World Industries, Inc: www.armstrong.com.
      b. Mannington Mills, Inc: www.mannington.com.
      c. Tarkett Inc: www.tarkett.com.
      d. Substitutions: Not permitted.

2.02 MATERIALS - BASE

A. Resilient Base: ASTM F 1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove, and as follows:
   1. Height: 4 inch.
   2. Thickness: 0.125 inch thick.
   3. Finish: Satin.
   4. Length: Roll.
   5. Color: Solid color.
   6. Accessories: Premolded external corners and end stops.
   7. Manufacturers:
      a. BurkeMercer Flooring Products: www.burkemercer.com.
      b. Johnsonite, Inc: www.johnsonite.com.
      c. Roppe Corp: www.roppe.com.
      d. Substitutions: Not permitted.

2.03 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.

C. Moldings and Edge Strips: Same material as flooring.
   1. Product: #633 Tile Reducer manufactured by Mercer Plastics Company.
   2. Product: #400 Custom Edge manufactured by Mercer Plastics Company.
   3. Product: #160 Universal Reducer manufactured by Mercer Plastics Company.

D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are dust-free and free of substances which would impair bonding of adhesive materials to sub-floor surfaces.

B. Verify that concrete sub-floor and self leveling underlayment surfaces are ready for resilient flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F 710; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

C. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

B. Prohibit traffic until filler is cured.

C. Clean substrate.

3.03 INSTALLATION - TILE FLOORING

A. Install in accordance with manufacturer's instructions.

B. Mix tile from container to ensure shade variations are consistent when tile is placed.

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 flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

F. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.

G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.05 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean, seal, and wax resilient flooring products in accordance with manufacturer's instructions.

3.06 PROTECTION OF FINISHED WORK

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09680

CARPET

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet, stretched-in, with cushion underlay and direct-glued.

B. Accessories.

1.02 RELATED SECTIONS

A. Section 09650 - Resilient Flooring: Termination edging of adjacent floor finish.

1.03 REFERENCES

A. CRI 104 - Standard for Installation of Commercial Textile Floorcovering Materials; Carpet and Rug Institute; 2002.

1.04 SUBMITTALS

A. The following shall be submitted to the Contractor from the Owner for coordination and bidding purposes.
   1. One 24"x18" quality/color sample of each coloration and carpet type shall be submitted. Sample must be labeled with manufactures and suppliers' names. Samples submitted will be assumed to be the type, quality, color and weight to be installed.
   2. A copy of a printed installation manual written by the carpet manufacturers technical services department shall be submitted.
   3. Copies of manufacturers maintenance data; refer to Section 01780.
   4. After carpet order is placed, submit roll register lists. Such lists to remain on job site until after all carpet has been delivered and installed.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in installing carpet with minimum three years experience.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

B. Maintain minimum 70 degrees F ambient temperature 24 hours prior to, during and 24 hours after installation.

C. Ventilate installation area during installation and for 72 hours after installation.

PART 2 PRODUCTS

2.01 CARPET

A. Provided by the Owner and installled by the Contractor.

2.02 CUSHION

A. Provided by the Owner and installled by the Contractor.

2.03 ACCESSORIES

A. Sub-Floor Filler: Type recommended by carpet manufacturer.

B. Tackless Strip: Carpet gripper, of type recommended by carpet manufacturer to suit application, with attachment devices.

C. Adhesives: Compatible with materials being adhered. Non-staining, low ordor, solvent free, with no alcohol, glycol or ammonia, waterproof and strippable, and as recommended by the carpet manfuacturer for the installations involved. Adhesive shallcomply with OSHA Regulation 29 CFG 1910-1200. All containers shall contain safety data sheets and be available at the job site for inspection.

D. Seam Adhesive: Recommended by manufacturer.

E. Contact Adhesive: Compatible with carpet material; releasable type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are dust-free and free of substances which would impair bonding of adhesives to sub floor surfaces.

B. Verify that concrete sub-floor surfaces are ready for carpet installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by carpet manufacturer and adhesive materials manufacturer.

3.02 INSTALLATION - GENERAL

A. Install carpet in accordance with manufacturer's instructions and CRI 104.

B. Verify carpet match before cutting to ensure minimal variation between dye lots.

C. Lay out carpet:
   1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
   2. Do not locate seams perpendicular through door openings.
   3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
   4. Locate change of color or pattern between rooms under door centerline.
   5. Provide monolithic color, pattern, and texture match within any one area.

D. Install carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance.

3.03 STRETCHED-IN CARPET

A. Install tackless strips with pins facing the wall around entire perimeter, except across door openings. Use combination tackless strip/edge strip where carpet terminates at other floor coverings.

B. Space tackless strips slightly less than carpet thickness away from vertical surfaces, but not more than 3/8 inch.

C. Install cushion in maximum size pieces using spot adhesive to adhere to sub-floor.

D. Lay out cushion so that seams will be perpendicular to, or offset from, minimum 6 inches from carpet seams.

E. Butt cushion edges together and tape seams.

F. Trim cushion tight to edge of tackless strip and around projections and contours.

G. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to all cut edges immediately.

H. Join seams using hot adhesive tape. Form seams straight, not overlapped or peaked, and free of gaps.

I. Following seaming, hook carpet onto tackless strip at one edge, power stretch, and hook firmly at other edges. Follow manufacturer's recommendations for method and amount of stretch.

J. Trim carpet neatly at walls and around interruptions. Tuck edges into space between tackless strip and wall.

3.04 DIRECT-GLUED CARPET

A. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to cut edges of woven carpet immediately.

B. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.

C. Apply seam adhesive to the base of the edge glued down. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.

D. Roll with appropriate roller for complete contact of adhesive to carpet backing.

E. Trim carpet neatly at walls and around interruptions.

3.05 CLEANING

A. Remove excess adhesive from floor and wall surfaces without damage.

B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09720

WALL COVERING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall covering and borders.

1.02 RELATED SECTIONS

A. Section 09900 - Paints and Coatings: Preparation and priming of substrate surfaces.

1.03 REFERENCES

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2007.

B. ASTM F 793 - Standard Classification of Wallcovering by Use Characteristics; 2007.

1.04 SUBMITTALS

A. Copies of manufacturer's technical and application data shall be submitted to the Contractor by the Owner for the Contractor's use in surface preparation and knowledge of the materials to be installed.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the type of work specified in this section with minimum 3 years of documented experience.

1.06 MOCK-UP

A. Provide panel, 3 panel drops wide, full height, illustrating installed wall covering and joint seaming technique.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Inspect roll materials at arrival on site, to verify acceptability.

B. Protect packaged adhesive from temperature cycling and cold temperatures.

C. Do not store roll goods on end.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.

B. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.

C. Provide lighting level of 80 ft candles measured mid-height at substrate surfaces.

PART 2 PRODUCTS

2.01 MATERIALS

A. Wallcovering: Provided by the Owner, installed by the Contractor.

B. Requirements for All Wall Coverings:
   1. Surface Burning Characteristics: Flame spread/Smoke developed index of 15/10, maximum, when tested in accordance with ASTM E 84.

C. Adhesive: Waterproof and strippable, mildew and fungus inhibitor, non-bleeding, non-staining and equal to or lower fire hazard classification than the clasification for the wallcovering fabric.
   1. Adhesive and primer to be produced by the same manufacturer as listed below or an acceptable alternate:
      a. Roman Adhesives, Inc of Calument City IL.
         1) Primer: Ultra Prime 977
         2) Adhesive: Ultra Pro 880, or if pasting machine is used, provide Clear Strippable Pro 870.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are prime painted and ready to receive work, and conform to requirements of the wall covering manufacturer.

B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply wall coverings if moisture content of substrate exceeds level recommended by wall covering manufacturer.

3.02 PREPARATION

A. Wash impervious surfaces with tetra-sodium phosphate, rinse and neutralize; wipe dry.

B. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

3.03 INSTALLATION

A. Apply adhesive and wall covering in accordance with manufacturer's instructions.

B. Use wall covering in pattern sequence.

C. Razor trim edges on flat work table. Do not razor cut on gypsum board surfaces.

D. Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface. Butt edges tightly.

E. Horizontal seams are not acceptable.

F. Do not seam within 2 inches of internal corners or within 6 inches of external corners.

G. Cover spaces above and below windows, above doors, in pattern sequence from roll.

H. Where wall covering tucks into reveals, or metal wallboard or plaster stops, apply with contact adhesive within 6 inches of wall covering termination. Ensure full contact bond.

I. Remove excess adhesive while wet from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

3.04 CLEANING

A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.

B. Reinstall wall plates and accessories removed prior to work of this section.

END OF SECTION

SECTION 09900

PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Includes furnishing and application of painting materials to surfaces, including:
   1. Surface preparation of surfaces to be painted.
   2. Touching up of prime coats and other preparation necessary prior to finish painting.
   3. Painting, staining mid otherwise finishing of new surfaces as indicated/scheduled on the Drawings and specified in this and other Sections of this Project Manual.

B. Paint as used herein means all coating systems materials including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats,

C. Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors or materials /are designated in “schedules”. Where items or surfaces are not specifically mentioned paint the same as similar adjacent materials or areas. If color or finish is not designated, Architect will select these colors from standard colors or finishes available.

1.02 RELATED SECTIONS

A. Section 03300 – Cast in Place Concrete: Painting of exposed concrete as scheduled.

B. Section 03415 - Pre-cast Concrete Hollow Core Planks: Painting of exposed concrete planks, as scheduled.

C. Section 05120 - Structural Steel: Painting of exposed steel members not scheduled to receive fireproofing material.

D. Section 05500 - Metal Fabrications: Painting of exposed metal items.

E. Section 05510 - Metal Stairs: Painting of exposed metal items / members.

F. Section 06200 - Finish Carpentry: Painting staining and otherwise finishing of finish carpentry items.

G. Section 06415 - Carpentry and Millwork: Painting, staining and otherwise finishing of the cabinetry and millwork items not receiving factory applied finish.

H. Section 07920 – Sealants and Caulking: Coordination of sealant and caulking installation with application of paint.

I. Section 08110 - Hollow Metal Doors and Frames: Surface preparation and painting of all hollow metal work.

J. Section 08211 - Wood Doors: Surface preparation and painting of wood doors.

K. Section 08710 - Finish Hardware: Installation of hardware items after finish painting is complete.

L. Section 09260 - Gypsum Wallboard: Surface preparation and painting of gypsum wallboard systems.

M. Division 15 - Mechanical: Painting of mechanical equipment exposed to view and exposed to weather.

N. Division 16 - Electrical: Painting of electrical equipment exposed to view and exposed to the weather.

1.03 QUALITY ASSURANCE

A. Acceptable Manufacturers: The following manufacturers are acceptable for use on this project subject to compliance with requirements:
   1. Sherwin Williams
   2. Benjamin Moore Company
   3. Porter Paint Company
   4. Pittsburgh
   5. Olympic Paints and Stains

B. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.

C. Coordination of Work: Review other Sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings systems for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used,

D. Sample Area: A sample area of block filer shall he applied on a designated interior wall of the project as well as a sample area of the “final appearance”. Such sample walls must be reviewed and accepted by the Owner and the Architect prior to proceeding with any other paint application.

E. Acceptable Surfaces: The paint contractor and General Contractor shall be solely responsible for determining that the wall is ready and suitable to he painted.

F. Spray Equipment: Block filler and paint for masonry walls must be roller or brush applied. Spray equipment will not be permitted for this work.

1.04 SUBMITTALS

A. Submit color chips and manufacturer’s product data to the Architect for color selection and product review. Submittals shall include spread and coverage rate per coat.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver products and materials in original unbroken containers with legible labels intact bearing manufacturer’s brand and name with application instructions printed thereon. Paint shall arrive on the job ready mixed, except for tinting of undercoats and possible thinning as recommended by manufacturer.

1.06 JOB CONDITIONS

A. Inspection of Surfaces: The painting Contractor shall be responsible for inspecting the work of others prior to the application of any painting or finishing material. If any surface to be finished cannot be in proper condition for finishing by customary cleaning, sanding, and puttying operations, the painting contractor shall immediately notify the General Contractor in writing or assume responsibility for and rectify any unsatisfactory finish resulting.

B. Environmental Requirements: Comply with manufacturer’s recommendations as to environmental conditions under which coatings and coating systems can he applied. Do not apply finish in areas where dust is being generated.

C. Protection: All materials used on the job shall be stored in a single place designated by the Contractor. Such storage place shall be kept neat and clean. All damage to the storage area and its surroundings shall be repaired. Any soiled or used rags, waste and trash must be removed from the building every night, and every precaution taken to avoid the danger of fire.

D. Protect surfaces and objects inside and outside the building, as well as the grounds, lawns, shrubbery, and adjacent properties against damage. The painting contractor shall hold himself responsible for damage to adjacent furnishings.

E. This project has Interior Design Drawings. The Contractor is to verify with the Interior Design Drawings prior to applying any of the following paints or paint finishes contained in Part 2 of the following Specification to the building's interior. Interior items addressed within this Specification that are not addressed in the Interior Design Documents shall be applicable to this Specification over the Interior Design Drawings.

PART 2 PRODUCTS

2.01 MATERIALS

A. All paint and primer applied in the field shall be the products of a single manufacturer. For the purpose of clarification, only the products of one manufacturer have been listed herein. Refer to “Paint and Vinyl Wallcovering Schedule” in Drawings for specific paints and colors.

B. Extra Stock: Supply an extra 2% of total quantity of each paint used with a minimum of three (3) gallons of each paint. Furnish in manufacturers unopened, labeled containers for Owner’s use.

2.02 PAINTING SCHEDULE

A. Exterior Painting Schedule - Colors as Selected by Architect:
   1. Galvanized Metal, Including Weather Exposed HVAC and Electrical Equipment
      a. First coat: SW Galvite B50W3 Series, DFT mils: 2. Omit first coat on items where compatible factory primer has been applied.
      b. Second and third coats: SW Industrial Enamel B54 Series, DFT mils: 2.5, each coat
   2. Ferrous Metals, Including Weather Exposed HVAC and Electrical Equipment:
      a. First coat: SW Kem Kromik Metal Primer B50 Series, DFT mils: 3. Omit first coat on items where compatible factory primer has been applied.
      b. Second and third coats: SW Industrial Enamel B54 Series, DFT mils: 2.5, each coat
   3. Copper/Aluminum, Including Weather Exposed HVAC and Electrical Equipment:
      a. First coat: SW Zinc Chromate Primer B50Y1 Series, DFT mils: 3.
      b. Second and Third coats: SW Industrial Enamel B54 Series, DFT mils: 2.5, each coat.
   4. Masonry/Concrete
      a. First coat: SW Heavy Duty Block Filler B42W46 Series, DFT mils: 10.
      b. Second and Third coats: SW A-100 Gloss, Latex House Paint A8 Series, DFT mils: 1.4, each coat.
   5. Wood Gates:
      a. Two (2) coats Olympic Semi-Transparent Linseed Oil Stain.
   6. Weather Exposed Ferrous Piping:
      a. First coat: SW Kem Kromik Metal Primer B50WI Series, DFT mils: 3.
      b. Second and Third coats: SW Silver-Brite Aluminum B59511 Series, DFT mils: 1 per coat.

B. Interior Painting Schedule - Colors as selected by Architect
   1. Galvanized Metal:
      a. First coat: SW Galvite B50WS Series. DFT mils: 2. Omit first coat on items where compatible factory primer has beet, applied.
      b. Second and third coats: SW Industrial Enamel B54 Series, DFT mils: 2, each coat,
   2. Ferrous Metals - Semi-Gloss Enamel
      a. First coat: SW Kern lKroxnik Metal Primer B50 Series, DFT mils: 3.
      b. Omit first coat on items where compatible factory primer has been applied.
      c. Second and third coats: SW Industrial Enamel B54 Series, DFT mils: 2, each coat.
   3. Ferrous Metals - Gloss Epoxy Finish

a. First coat: SW Water Based Catalyzed Epoxy Primer B70 Series, DFT mils: 5.0.
b. Second and Third coats: SW Water Based Catalyzed Epoxy B70 Series, DFT mils: 3.0 per coat.

4. Galvanized Steel - Gloss Epoxy Finish
   a. Two (2) coats SW Water Based Catalyzed Epoxy B70 Series, DFT mils: 3.0 per coat.
5. Gypsum Drywall - Semi-Gloss Enamel Finish:
   a. First coat: SW ProMar 200 Latex Wall Primer B28 Series, DFT mils: 1.5.
   b. Second and Third coats: SW ProMar 200 Alkyd Semi-Gloss Enamel B34 Series, DFT mils: 2, each coat.
6. Gypsum Wallboard - Flat Finish:
   a. First coat: SW ProMar 400 Latex Wall Primer, B28 Series, DFT mils: 1.1.
   b. Second and Third coats : SW ProMar 200 Latex Flat Wall Paint, B30 Series, DFT mils: 1.4.
7. Gypsum Wallboard - Egg-Shel Enamel Finish:
   a. First coat: SW ProMar 200 Latex Wall Primer B28 Series, DFT mils: 1.4.
   b. Second and Third coats: SW ProMar 200 Alkyd Eg-Shel Enamel B20 Series, DFT mils: 1.8, each coat.
8. Gypsum Drywall - Gloss Epoxy Finish:
   a. First coat: SW Pro-Mar 200 Latex Wall Primer B28 Series, DFT mils: 1.4.
   b. Second and Third coats: SW Water Based Catalyzed Epoxy B70 Series, DFT mils: 3.0 per coat.
9. Wood - Semi-Gloss Enamel Finish:
   a. AWl Custom Grade (Quality Standards Section 1500) for all painted (opaque) finished items.
   b. AWI Custom Grade, System 9, Catalized Primer-Surfacer, with two (2) top coats. Sand surfacer-primer with 220 grit stearated paper.
10. Wood - Open Grain and Close Grain - Stained Finish:
    a. AWl Premium Grade (Quality Standards Section 1500) for all transparent finished items.
    b. AWL Premium Grade, System TR-6, Catalized Polyurethane, with stain, reduced vinyl sealer washcoat, filler two (2) top coats. Sand vinyl sealer with 220 grit stearated paper.
11. Concrete, Pre-cast Concrete Planks and Concrete Block - Gloss Enamel Finish:
    a. First coat: SW Heavy Duty Block Filler B42W46 Series, DFT mils: 10.
    b. Second and Third coats - SW Industrial Enamel B54 Series, DFT mils: 2, each coat.
12. Concrete, Pre-cast Concrete Planks - Eg-Shel Enamel Finish:
    a. First coat: SW Heavy-Duty Block Filler B42W46 Series, DFT mils: 10.
    b. Second and Third coats - SW ProMar 200 Latex Eg-Shel Enamel 1120 Series, DFT mils: 1.5, each coat.
13. Concrete Block, Pre-cast Concrete Planks - Gloss Epoxy Finish:
    a. First Coat - SW Heavy-Duty Block Filler B42W46 Series @ 10 mils DFT.
    b. Second and Third coats - SW Water Based Catalyzed Epoxy B70 Series, DFT mils: 3.0 per coat.
14. Textured Ceiling Finish: One (1) coat spray-applied United States Gypsum Imperial QT Spray Texture Finish, medium texture.
15. Guestroorn Bath Ceilings - “Light Orange Peel Texture, Latex Semi-Gloss Enamel Finish:
    a. First coat - SW ProMar 200 Latex Wall Primer B28W200 Series, DFT mils: 1.5.
    b. Second and Third coats - SW Pro-Mar 200 Latex Semi-Gloss Enamel B31 Series, DFT mils: 2, each coat.

PART 3 EXECUTION

3.01 COOPERATION WITH OTHER TRADES

A. This work shall be scheduled and coordinated with other trades and shall not proceed until other work and job conditions are as required to achieve satisfactory results.

3.02 GENERAL REQUIREMENTS

A. Before starting any work, surfaces to receive paint finishes shall be examined carefully for defects which cannot be corrected by the procedures specified herein and which might prevent satisfactory painting results. Work shall not proceed until such damages are corrected.

B. Secure approval of color samples before applying any paint or finish. All priming coats and undercoats shall he tinted to the approximate shade of the final coat.

C. Start of painting shall be construed as acceptance of the surfaces to receive paint or other finish.

D. Maintain temperature in building at constant 650F, or above, during drying of masonry, and provide adequate ventilation for escape of moisture from building in order to prevent mildew, damage to other work and improper drying of paint. Once painting has commenced, provide constant temperature of 65SF, or above, and prevent wide variation in temperature which might result in condensation on freshly painted surfaces.

E. Surfaces to receive work described in this section shall be smooth, even, sound thoroughly clean and dry and free of defects which would adversely affect application of this work. Surfaces which do not meet the tolerances or quality requirements imposed within the specifications governing substrate construction, shall he repaired or replaced prior to initiating this work.

F. All materials shall be mixed, thinned, modified, and applied only as specified by the manufacturer's direction on the container,

G. Application shall be sufficiently heavy to achieve pleasingly uniform color and lucid effect; matching approved sample.

H. All coats shall be thoroughly dry before applying succeeding coats.

I. The number of coats specified is intended to provide full coverage. Satisfactory coverage subject to the approval of the Architect. Additional coat or coats will be required by the Architect if these coats do not give sufficient coverage. Final coat shall match approved sample panel.

3.03 PREPARATION OF SURFACES

A. General
   1. Surfaces shall be clean, dry and adequately protected from dampness.
   2. Surfaces shall be smooth, even and true to plane.
   3. Surface shall be free of any foreign material which will adversely affect adhesion or appearance of applied coating.
   4. Remove all loose, spalling paint from previously painted surfaces utilizing wire brushes, pressure washing or mechanical means, as required to provide a smooth and sound substrate for the application of new paint.
   5. Mildew shall be removed and neutralized hy scrubbing affected areas thoroughly with a solution made by adding two ounces of Tri-Sodium Phosphate and eight ounces of Sodium Hypochloride (Clorox) to one gallon warm water. Use a scouring powder if necessary to remove mildew spores. Rinse with clear water and allow to dry before painting.
   6. Efflorescence on any area that is scheduled to be painted shall be treated as herein specified provided that the structural defects allowing the entrance of moisture are corrected before painting.

7. Scrub off efflorescence with a commercial lime solution or one (1) part commercial muriatic acid to five (5) parts water, then rinse with clear water and allow surface to thoroughly dry before painting.

B. Gypsum Wallboard:
   1. Fill narrow shallow cracks and small holes with spackling compound.
   2. Rake deep, wide cracks and deep holes.
      a. Dampen with clear water.
      b. Fill with thin layers of drywall joint cement.
   3. Allow to thoroughly dry.
   4. Sand smooth. Do not raise nap of paper on wallboard

C. Wood:
   1. Clean soiled surfaces with alcohol wash.
   2. Except where rough exterior surface is specified, sand to smooth and even surface, then dust or vacuum.
   3. Apply shellac to all knots, pitch and resinous sapwood before priming coat is applied.
   4. Fill nail holes, cracks, open joints and other defects with wood filler or lead putty as required after priming coat has dried. Filler material must be compatible with finish being applied. Color to match finish color.

D. Preparation of Ferrous Metal Surfaces:
   1. Remove rust, mill scale and defective paint down to sound surface or bare metal, using scraper, sandpaper, or wire brush as necessary. Grind if necessary to remove shoulders at edge of sound paint to prevent flaws from photographing through finish coats.
   2. Remove dirt and grease with mineral spirits and wipe dry with dean cloths.
   3. Touch-up all bare metal and damaged shop coats with specified rust-inhibitive primer.
   4. Necessary touching up of shop primer shall be done on ferrous metal surfaces of all items installed adjacent to concrete and masonry prior to any openings between metal surface and adjacent surfaces being filled in or caulked.

E. Preparation of Galvanized Metal Surfaces
   1. Remove dirt and grease with mineral spirits and wipe dry with clean cloths.
   2. All galvanized steel surfaces shall be pre-treated with proprietary acid-bound resinous or crystalline zinc phosphate preparations used according to the manufacturer's directions prior to painting.

F. Preparation of Masonry and Concrete Surfaces:
   1. Masonry surfaces must be free from dirt, loose or excess mortar and be thoroughly dry. Perform moisture test prior to application of paint over any masonry surface. Moisture content must he within range recommended by paint manufacturer for the application involved.
   2. Point all open mortar joints; fill all holes with mortar.
   3. Comply with requirements set forth in Section 03300 for patching and repairing of concrete surface irregularities prior to application of any paint materials.

G. Preparation of Aluminum Surfaces: Remove dirt and grease with mineral spirits, and wipe dry with clean cloths.

H. Preparation of Copper Surfaces:
   1. Buff or polish surfaces to bright color.
   2. Remove dirt and grease from surface with a mild phosphoric acid. Wipe dry with clean cloths.
   3. Apply finish while surface is clean and bright.

3.04 APPLICATION

A. General:
   1. Protection of Adjacent Surfaces and Mixed Items:
      a. The Contractor not only shall protect his work at all times, but shall also protect all adjacent work and materials by drop cloth covering or other methods during progress of his work.
      b. Remove and protect hardware, accessories, device plates, lighting fixtures, factory finished work, and similar items, or provide ample in-place protection. Upon completion of each space, carefully replace all removed items. This work shall be done only by skilled mechanics.
      c. Remove electrical panel box covers and doors before painting wall. Paint separately and reinstall after pain is dry.
   2. The undercoats of paint and enamel shall be of approximate shade of the final coat. All metal surfaces calling for enamel or varnished finish shall first have priming coat well sanded, and shall be sanded between coats with fine sandpaper or steel wool that will produce an even, smooth finish. Each coat shall be perfectly dry before applying succeeding coats.
   3. Do not apply initial coating until moisture content of surface is within limitations recommended by paint manufacturer. Test with moisture meter. Exterior surfaces shall not be painted in damp, frosty, or cold weather. Latex paints shall not he applied when surface or air temperature is below 500F.
   4. Surfaces shall he finished the same as nearest or adjoining surfaces unless otherwise shown.
   5. Exposed access doors or panels, exposed electric panelboard covers, exposed pipes, ducts and raceways shall he painted the same color as adjacent surfaces. All piping exposed in finished areas shall be painted as required for interior ferrous metal. Where galvanized pipe occurs, prime galvanized surface as specified.
   6. Hardware and accessories, fixtures and similar items placed prior to painting shall be removed or protected during painting, replaced on completion of painting.
   7. Remove silencers from metal door frames prior to painting. Afterwards, replace silencers.
   8. The tops, bottoms and edges of all doors to be painted shall be finished to match the surface of the doors after the hardware has been attached, Any door found unpainted upon the completion of the painting work shall be taken down and painted.
   9. All suction spots in concrete which are noticeable after application of the first coat shall he touched up before applying the second coat.
   10. Any exposed metal such as chairs, nails or tie wires in reinforced concrete slabs shall be covered with a rust inhibitive material.
   11. All weather exposed HVAC and electrical equipment shall be painted.

3.05 APPLICATION OF TEXTURED CEILING FINISH

A. Remove all foreign matter from ceilings, and provide smooth surface for finish work. Patch low points and rough places. Prime ceiling per manufacturer's recommendations. Mix material so that material will stay in suspension while machine is pumping. Apply evenly and with proper coverage so that no seams will show to a minimum thickness of 1/16. Protect all walls and adjacent areas with masking paper.

3.06 FIELD QUALITY CONTROL

A. The first finished area or item of each color scheme required shall be reviewed by the Architect for color, texture, and workmanship.

B. First acceptable area or items shall he used as project standard for each color scheme.

3.07 CLEANUP

A. During progress of the work, keep areas free form any unnecessary accumulation of tools, equipment and surplus materials and debris.

B. At completion of work, the painting contractor shall remove from the premises all surplus painting materials and all debris created by him; he shall remove all spatters and leave his part of the work in a clean and finished condition.

END OF SECTION

SECTION 09940

DECORATIVE FINISHES

PART 1 GENERAL

1.01 SUMMARY

A. Provide all labor, materials, equipment and tools to install the PERMATONE Interior Finish Coatings

B. Related sections
   1. Section - 09210 Gypsum Plaster
   2. Section - 09220 Portland Cement Plaster
   3. Section - 09260 Gypsum Board Assemblies
   4. Other sections related to the substrate over which the coatings are to be applied.

C. DESCRIPTION OF THE SYSTEM:
   1. A field application of wall surface primers, undercoats and textured coatings manufactured by PERMATONE, INC., Houston, TX.

D. DESCRIPTION:
   1. Work includes masking, protection of surfaces not intended to be coated, priming, finishing, clean-up and touch-up of areas as designated on the drawings and contract documents to be coated.

1.02 REFERENCES

A. PERMATONE, INC.: Manufacturer of the PERMATONE Interior Finishes.
   1. ASTM E-84 Surface Burning Characteristics of Building Materials.
   2. MIL-M-146 Military Spec Burning Characteristics & Composition of Atmosphere.
   3. ASTM G-23 Accelerated Weathering
   4. ASTM B-117 Salt Fog Resistance
   5. ASTM D-1735 Moisture Resistance
   6. ASTM TT-C-5558 Wind Driven Rain
   7. MILSPEC 9l0B 3508 Mildew Resistance
   8. ASTM E96 Water Vapor Transmission ASTM 0-968 Abrasion Resistance
   9. ASTM Modified E-96 Permeance Test

1.03 DEFINITIONS

A. PERMATONE INTERIOR FINISH SYSTEM
   1. A field application of primers, undercoats and textured coatings manufactured by PERMATONE INC., Houston, TX.

B. PERMATONE WALLTEXTURE DESIGNS: A collection of diverse texture finishes manufactured by PERMATONE, INC
   1. Coatings
      a. QuartzSilco: Fine finish for diverse textures
      b. QuartzMural: Rustic high-relief textured finish
      c. Palladio: High gloss smooth Venetian plaster finish
      d. Tevere: Matte smooth Venetian plaster finish
      e. Agostino: Medium gloss smooth honed Venetian plaster finish
      f. Marmolino: Matte rustic Venetian plaster finish
      g. Sabbia: Limestone appearance Venetian plaster finish
      h. Cerami: Smooth polished stone appearance finish
      i. Chiffon: Smooth old-world matte stucco finish
      j. Craquelatto: Antiqued broad crack finish

k. Castello: Translucent glaze
l. Riflexi: Pearlescent shimmer glaze
m. Corever Texture: Rough cut granite finish
n. Corever Micro: Smooth cut stone finish

2. Support Products
a. Sottofondo: Clear acrylic primer and consolidator
b. Pintufondo: Vapor permeable mildew resistant acrylic primer
c. CorevMix: Permeable finely ground base leveling material
d. CorevBase: Acrylic gap filler and leveler
e. Vittroseal: Permeable mildew-resistant surface sealer
f. PermaWax: Acrylic protective finishing wax for Venetian plasters

C. SUBSTRATE: The surface to which the PERMATONE Interior Finish System is adhared

1.04 QUALITY ASSURANCE

A. MANUFACTURER QUALIFICATIONS:
1. Shall be PERMATONE, INC. All materials shall be manufactured or sold by PERMATONE, INC., and shall be purchased from PERMATONE or its authorized Distributor in order to insure compatibility of system components.

B. CONTRACTOR QUALIFICATIONS:
1. Shall be trained in the proper installation of, and knowledgeable in the application of specialty interior finishes.
2. Upon request PERMATONC will provide a list of applicators experienced in applying PERMATONE Interior Finish Coatings.

C. GENERAL DESIGN AND DETAILS
1. GENERAL DESIGN:
a. Internal or external radii of walls or columns to be coated shall be greater than 1 foot for trowel applied textures.
b. Working clearance of at least 3-feet to the surface to be coated is required.
c. Coatings shall not be used in any areas defined as floor.

2. SUBSTRATES
a. Substrate systems must be designed to withstand all applicable loads and in compliance with all applicable codes.
b. The following are approved substrates:
1) Properly prepared new and existing drywall
2) Properly prepared smooth, concrete or stucco
3) Properly prepared CMU Block
4) PERMATONE, INC may approve other substrates.

3. MOCKUP
a. The contractor shall, before the project commences, provide the owner/Design Professional with a mock up for approval.
b. The Mockup shall be a size (4' x 4') or larger so as to accurately represent the application, color and texture specified
c. The approved mock up represents final acceptance of the finish, texture and color to be used on the project. The mock up shall be available and maintained at the jobsite.

1.05 SUBMITALS

A. SAMPLES:
1. Two 1’ x 1’ samples of the PERMATONE Interior Finish Coatings consisting of the proper finish coating, texture and color shall be prepared using the same tool and technique required by the job.

B. REPORTS AND QUALIFICATIONS:
   1. Upon request from the Design Professional, selected test results or copies of test reports shall be submitted,
   2. A qualified applicator shall submit project references to the general contractor prior to the application of the product.

C. PRODUCT DATA:
   1. The contractor shall submit to the owner, Design Professional and General Contractor the Manufacturers specifications and individual product data sheets describing the products selected for use on the project.

1.06 DELIVERY, STORAGE AND HANDLING

A. PERMATONE Interior Finish Coatings should be stored in a cool, dry place at a temperature of 40°F. or higher. Materials should not be stacked more than three containers high.

B. Products shall be delivered to jobsite in unopened containers with labels intact.

C. Materials must be remixed immediately before use and resealed after use. Refer to the individual product data sheets for specific mixing instructions.

1.07 JOB CONDITIONS

A. ENVIRONMENTAL CONDITIONS:
   1. Materials shall not be applied to a substrate with a temperature less than 40°F. Substrate must be completely dry.
   2. The ambient air temperature shall be 40°F. or higher at a time of installation and remain so for twenty-four (24) hours thereafter.
   3. Relative humidity shall not exceed 50% @ 77°F to ensure proper and timely curing.
   4. Protect installed finishes from impact for a period of 48-hours after installation. Low temperature and higher humidity during installation will lengthen the necessary curing time.

B. GENERAL CONTRACTOR OBLIGATIONS:
   1. General Contractor shall provide access to electric power and clean water where PERMATONE Interior Finish Coatings are to be installed.

C. PROTECTION:
   1. Adjacent areas and materials shall be protected to preclude damage during material application. Immediately clean with water any spillage on surfaces not intended to receive the coatings.

D. COORDINATION:
   1. Proper scheduling of the installation will be coordinated with the General Contractor and the job will be staffed to maintain the schedule established by the General Contractor.

1.08 LIMITED WARRANTY

A. Provide 10-year materials integrity warranty and 10-year mold/mildew warranty from manufacturer for manufacturer's approved substrates.
   1. PERMATONE, INC. offers a ten (10) year limited warranty for materials.

PART 2 PRODUCTS

2.01 GENERAL

A. All materials shall be obtained directly from PERMATONE, INC., or through its authorized distributors.

B. Substitutions or additions of other products shall not be used to modify or replace any of the PERMATONE Interior Finish Coatings system components.

2.02 AS MANUFACTURED BY PERMATONE

A. PRIMERS
   1. Pintufondo: An acrylic, high solids substrate primer with integral color. Designed with silica fillers to enhance adhesion properties. Used as a pigmented primer and as an adhesion intermediary for finish coatings.
   2. Sottofondo: Clear acrylic primer and consolidator with high algaecide and fungicide properties. Used to promote adhesion and prepare deteriorated substrates to be coated with PermaTone finish.
   3. Vittroseal: An acrylic, clear, semi-gloss, permeable and mildew resistant wall surface sealer. Used with QuartzSilco and other finishes to improve water and stain resistance in kitchens, bathrooms and high traffic environments.
   4. PermaWax: An acrylic protective finishing wax for Venetian plasters.

B. BASE OR UNDERCOAT
   1. CorevMix: A sandable, acrylic undercoat formulated with extra fine particle fillers to produce a smooth, tight, low absorption surface matrix. Used on minor repairs and holes of less than 1/8" in depth and as a surface leveler to provide a uniform base for PermaTone finishes. Its surface hardness and low absorption properties make it the required undercoat for Palladio.
   2. CorevBase: An acrylic, flexible basecoat used as a floating compound to render surfaces such as CMU, masonry and tile adequately smooth for application of PermaTone finishes.

C. PERMATONE WALLTEXTURE DESIGNS: Factory mixed, integral color, textured finish coatings.
   1. QuartzSilco, QuartzMural, Palladio, Tevere, Agostino, Marmolino, Sabbia, Cerami, Craquelatto, Castello, Riflexi, Corever Texture, and Corever Micro. Each one of the PermaTone finishes has unique properties, limitations, and installation and handling requirements. Please refer to individual product datasheets for selection of a finish.

D. PERMATONE WALLTEXTURE DESIGNS FOR THIS PROJECT AS FOLLOWS;
   1. Interior Finish: QUARTZSILCO
   2. Texture: Damascus
   3. Color: As selected by the Architect or Interior Designer from the manufacture's standard colors

2.03 SYSTEM PERFOMANCE CHARACTERISTICS

A. FIRE TEST PERFORMANCE
   1. ASTM EM Surface Burning Characteristics: Flame Spread less than 5”.
   2. Military Spec MIL-M-146 (Burning Characteristics & Composition of Atmosphere):
      a. General Results

1)	Weight Loss	2.5gr
2)	Bellstein Test	Negative
3)	Smoke Development	Light
4)	Flame Spread	5”
5)	Ash	Light

b. Composition of Atmosphere in (PPM) should meet:

1)	Chlorine	0
2)	Hydrogen Chloride	0
3)	Phosgene	0
4)	Ammonia	0
5)	Cyanides as HIGH	0
6)	Sulphur Oxide	0
7)	Carbon Monoxide	120

B. GENERAL PHYSICAL PROPERTIES:

1. ASTM G-23 Accelerated Weathering (2000-hrs): The PERMATONE Interior Finish Coatings show no deterioration or color change.
2. ASTM B 117 Salt Fog Resistance: The PERMATONE Interior Finish Coatings show no change after 500 hours at 5% salt fog.
3. ASTM 0-1735 Moisture Resistance: The PERMATONE Interior Finish Coatings show no change after 500 hours of 100% water fog.
4. Fed. Spec. Tt-C555B Wind Driven Rain: The PERMATONE Interior Finish Coatings show no more than a 0.35% weight gain after 24 hours exposure.
5. Military Standard 810B Method 3508 Mildew Resistance: The PERMATONE Interior Finish Coatings will show no fungus growth.
6. ASTM E-96 Water Vapor transmission: The PERMATQNE Interior Finish Coatings will have a minimum Permeance at 24.4 perms.
7. ASTM D-968 Abrasion Resistance: The PERMATONE Interior Finish Coatings show no effect after 1000 liters of sand.

PART 3 EXECUTION

3.01 EXAMINATION

A. Prior to installation of the PERMATONE Interior Finish Coatings, the substrate shall be examined by a PERMATONE approved applicator or representative to determine the following:

1. The substrate is appropriate for use with PERMATONE Interior Finish Coatings.
2. The substrate is as specified in the construction plans and is sound and otherwise ready for installation.
3. The surface of the substrate is tree of foreign materials such as paint, wax, glazing, moisture, dust, dirt, or oil.
4. The dimensional correctness of the substrate is as specified in this document.
5. Surfaces have been prepared in accordance with the recommendations outlined in these specifications and the individual product data sheet for the selected finish.
6. Any discrepancies will be immediately brought to the attention of the general contractor and Design Professional and work shall not proceed until satisfactory conditions have been rectified.

3.02 WALL PREPARATION

A. NEW GYPSUM TAPED AND FLOATED DRYWALL:

1. Repair any minor damage, holes and scratches on drywall with COREVMIX or joint compound. Allow the leveling compound to dry for 24-hours before priming.
2. Surfaces shall be paint ready (Level 4).
3. For finishes requiring primer, apply PINTUFONDO in the specified color over the entire surface.
4. For finishes requiring a Level 5 wall surface, apply CorevMix over the entire surface. Consult the CorevMix product datasheet for specific instructions.

B. LATEX PAINTED DRYWALL:
   1. Scrape off any loose paint.
   2. Repair any minor damage, holes and scratches on drywall with COREVMIX or joint compound. Allow the leveling compound to dry for 24-hours before priming.
   3. Surfaces shall be paint ready (Level 4).
   4. For finishes requiring primer, apply PINTUFONDO in the specified color over the entire surface. Consult the Pintufondo product datasheet for specific instructions.
   5. For finishes requiring a Level 5 wall surface, apply CorevMix over the entire surface. Consult the CorevMix product datasheet for specific instructions.

C. GYPSUM DRYWALL WITH WALLCOVERING:
   1. Strip on all existing wall paper or vinyl wall covering, along with any excess adhesive, taking care not to damage drywall core paper.
   2. Mildew covered walls must be allowed to dry thoroughly by providing adequate ventilation.
   3. Mildew residue must be removed from the wall surface, or it may be sealed off by rolling one coat of SOTTOFONDO over the entire surface. Mildew can be removed by slightly sanding the drywall or by washing it with a mild solution of chlorine bleach and water.
   4. Apply a thin coat of COREVMIX or joint compound over exposed drywall core and surface irregularities. Coat must be positively attached to substrate. Allow 24-hours drying time between coats.
   5. Apply PINTUFONDO in the specified color over the entire surface.
   6. Verify that all areas are sound after installing PINTUFONDO.

D. SMOOTH CONCRETE OR STUCCO:
   1. On stucco walls, verify that surface is sound and free of efflorescence.
   2. Scrape off any loose paint if surface is painted.
   3. Spray or roller apply Sottofondo over the entire surface.
   4. Surfaces shall be paint ready (Level 4).
   5. For finishes requiring primer, apply Pintufondo in the specified color over the entire surface. Consult the Pintufondo product datasheet for specific instructions.
   6. For finishes requiring a Level 5 wall surface, apply CorevMix over the entire surface. Consult the CorevMix product datasheet for specific instructions.

E. CONCRETE BLOCK (CMU):
   1. Surface plane of block must be smooth and even with flush joints.
   2. Spray or roller apply Sottofondo over the entire surface.
   3. Apply CorevBase over the entire surface in a thickness not to exceed 30-mils and allow product to dry 6 to 8 hours. Consult the CorevBase product datasheet for specific instructions.
   4. Repeat coats as necessary to achieve an acceptable surface for the application of the finish coat.
   5. Allow the last coat of CorevBase to dry for 24-hours before application of the finish coat.
   6. For finishes requiring primer, apply Pintufondo in the specified color over the entire surface. Consult the Pintufondo product datasheet for specific instructions.
   7. For finishes requiring a Level 5 wall surface, apply CorevMix over the entire surface. Consult the CorevMix product datasheet for specific instructions.

F. FERROUS METALS:
   1. Ferrous metal surfaces, such as drywall corner bead, must be properly treated with rust inhibitors before the application of PERMATONE WALLTEXTURE DESIGNS.

3.03 PRODUCT MIXING

A. PINTUFONDO: Stir well with paint mixer prior to using.

B. COREVMIX: Mix with a slow speed drill equipped with mixing paddle.

C. PERMATONE Finish Coatings:
   1. Small amounts of water (12 oz. or less per 5 gallon pail) may be added to the coatings to adjust workability. The same amount of water should be added to each bucket to ensure color consistency.
   2. PermaTone coatings should be mixed with a slow speed drill and used immediately after mixing. They should be kept in a closed container when not in use. Container shelf life will vary depending on storage conditions.
   3. No additives, other than water, should be added to the coating.
   4. Consult the individual product data sheets for specific instructions and limitations.

3.04 INSTALLATION

A. TEXTURE APPLICATION: GENERAL (Refer to individual product data sheets for specific instructions). Application technique will be determined by the final texture selected.

3.05 LIMITATIONS

A. Intended for use on interior wall and ceiling surfaces only.

B. Skilled application required.

C. Not compatible with solvents.

D. Patching limitations standard to applied coatings.

E. Use in well ventilated areas.

F. Protect face and eyes.

G. Refer to individual product datasheets for specific product limitations and warnings.

H. Testing data refers specifically to QuartzSilco and QuartzMural.

I. All PermaTone Walltexture Designs finishes share fire, flexibility and permeability performance characteristics.

END OF SECTION

SECTION 10165

PLASTIC LAMINATE TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Plastic laminate toilet compartments.

B. Urinal screens.

1.02 RELATED SECTIONS

A. Section 05120 - Structural Steel: Concealed steel support members.

B. Section 05500 - Metal Fabrications: Concealed steel support members.

C. Section 06114 - Wood Blocking and Curbing: Concealed wood blocking for compartment support.

D. Section 10800 - Toilet, Bath, and Laundry Accessories.

1.03 REFERENCES

A. ANSI A208.1 - American National Standard for Particleboard; 1999.

B. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.

C. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall and ceiling supports, door swings.

C. Product Data: Provide data on panel construction, hardware, and accessories.

D. Samples: Submit two samples of partition panels, 12 x 12 inch in size illustrating panel finish, color, and sheen.

E. Manufacturer's Installation Instructions: Indicate special procedures.

1.05 COORDINATION

A. Coordinate the work with placement of support framing and anchors in wall and ceiling.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Plastic Laminate Toilet Compartments:
   1. General Partitions Mfg. Corp: www.genpartitions.com.
   2. Global Steel Products Corp: www.globalpartitions.com.
   3. Sanymetal: www.sanymetal.com.
   4. Substitutions: Section 01600 - Product Requirements.

2.02 MATERIALS

A. Particleboard for Core: ANSI A208.1; composed of wood chips, sawdust or flakes, made with waterproof resin binder; of grade to suit application; sanded faces.

B. Plastic Laminate: NEMA LD 3, HGS.

C. Adhesive: Manufacturer's standard type.

2.03 COMPONENTS

A. Toilet Compartments: Plastic laminate finished, ceiling-hung.

B. Doors, Panels, and Pilasters: Plastic laminate adhesive and pressure bonded to faces and edges of particleboard core, with beveled corners and edges; edges of cut-outs sealed.
   1. Reinforce pilasters and panels with steel plate sandwiched in particleboard core at attachment points. Router cut openings as required.
   2. Plastic Laminate Colors: Color as selected for doors, color as selected for panels, finish as selected.

C. Door and Panel Dimensions:
   1. Thickness: 1 inch.
   2. Door Width: 32 inch.
   3. Door Width for Handicapped Use: 36 inch, out-swinging.
   4. Height: 58 inch.
   5. Thickness of Pilasters: 1-1/4 inch.

D. Urinal Screens: Wall mounted with two panel brackets, and ceiling vertical upright consisting of pilaster anchored to ceiling.

2.04 ACCESSORIES

A. Wall Brackets: Continuous type, polished stainless steel.

B. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
   1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.

C. Steel Plate Reinforcement: Carbon steel, prepared for fasteners, 1/8 inch thick.

D. Hardware: Polished stainless steel:
   1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
   2. Nylon bearings.
   3. Thumb turn door latch with exterior emergency access feature.
   4. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
   5. Coat hook with rubber bumper; one per compartment, mounted on door.
   6. Provide door pull for outswinging doors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated on shop drawings.

B. Verify correct spacing of and between plumbing fixtures.

C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.

C. Attached panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets.

E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 ERECTION TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.

B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10210

WALL LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Louvers, frames, and accessories.

1.02 RELATED SECTIONS

A. Section 07620 - Sheet Metal Flashing and Trim.

B. Section 07900 - Joint Sealers.

C. Section 15850 - Air Outlets and Inlets: Louvered penthouse.

1.03 REFERENCES

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 1998.

B. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2005.

C. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; Air Movement and Control Association International, Inc.; 2007.

D. AMCA 511 - Certified Ratings Program for Air Control Devices; Air Movement and Control Association International, Inc.; 1999(Rev 2004).

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.

D. Test Reports: Independent agency reports showing compliance with specified performance criteria.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

1.06 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wall Louvers:
   1. The Airolite Company: www.airolite.com.
   2. American Warming and Ventilating: www.awv.com.
   3. Construction Specialties, Inc: www.c-sgroup.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 LOUVERS

A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified under AMCA 511.
   1. Wind Load Resistance: Design to resist positive and negative wind load of 25 psf without damage or permanent deformation.
   2. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
   3. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.

B. Stationary Louvers: Horizontal blade, extruded aluminum construction, with intermediate mullions matching frame.
   1. Free Area: 50 percent, minimum.
   2. Blades: Drainable.
   3. Frame: 4 inches deep, channel profile; corner joints mitered and mechanically fastened, with continuous recessed caulking channel each side.
   4. Metal Thickness: Frame 0.081 inch; blades 0.081 inch.
   5. Finish: Polyvinylidene fluoride coating; finish welded units after fabrication.
   6. Color: As scheduled.

2.03 MATERIALS

A. Extruded Aluminum: ASTM B 221 (ASTM B 221M),.

B. Bird Screen: Interwoven wire mesh of steel, 0.063 inch diameter wire, 1/2 inch open weave, diagonal design.

C. Insect Screen: 18 x 16 size aluminum mesh.

D. Polyvinylidene Fluoride Coating: Minimum 70 percent Kynar 500/Hylar 500 resin, two coat finish, complying with AAMA 2604.

2.04 ACCESSORIES

A. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.

B. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared openings and flashings are ready to receive work and opening dimensions are as indicated on shop drawings.

B. Verify that field measurements are as indicated.

3.02 INSTALLATION

A. Install louver assembly in accordance with manufacturer's instructions.

B. Install louvers level and plumb.

C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.

D. Secure louver frames in openings with concealed fasteners.

E. Install perimeter sealant and backing rod in accordance with Section 07900.

3.03 CLEANING

A. Strip protective finish coverings.

B. Clean surfaces and components.

END OF SECTION

SECTION 10260

WALL AND CORNER GUARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Corner guards.

1.02 RELATED SECTIONS

A. Section 06114 - Wood Blocking and Curbing: Support blocking for wall and corner guard anchors.

B. Section 09720 - Wall Covering: Terminating wall covering at corner guard.

1.03 REFERENCES

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2007.

B. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2007.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate physical dimensions, features, anchorage details, and rough-in measurements.

1.05 PROJECT CONDITIONS

A. Coordinate the work with wall or partition sections for installation of concealed blocking or anchor devices.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wall and Corner Guards:
   1. Arden Architectural Specialties, Inc: www.ardenarch.com.
   2. Construction Specialties, Inc: www.c-sgroup.com.
   3. IPC/InPro Corporation: www.inprocorp.com.
   4. Tri-Guard.
   5. Substitutions: See Section 01600 - Product Requirements.

2.02 COMPONENTS

A. Corner Guard - Surface Mounted: Extruded one-piece unit, installed with methods mentioned in 3.02 Installation.
   1. Material: Type 304 stainless steel, No. 4 finish.
   2. Material: Polycarbonate, color as scheduled.
   3. Size: 1-1/2" inches.
   4. Length: One piece.

2.03 FABRICATION

A. Fabricate components with tight joints, corners and seams.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough-in for components are correctly sized and located.

3.02 INSTALLATION

A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.

B. Install corner guards at locations indicated on the Drawings. At Guest Rooms, start corner guard above carpet base. In Corridors, Lobby and Public Areas, start corner guards above resilient / carpet base. Install on all outside corners where wallcovering occurs. Attach to substrate using specified non-corrosive fasteners, suitable for the substrate involved. Installations shall be plumb, level and square.

C. At Laundry/Housekeeping and Back of House, start corner guard installation above resilient I tile base. Apply adhesive to the back side of the corner guards and partition ends in accordance with the manufacturer’s printed instructions. Position guards squarely on the wall and firmly press into place. Remove excess adhesive with solvents recommended by the adhesive manufacturer.

3.03 SCHEDULE

A. Laundry, Housekeeping and Back of Hous Areas: Stainless Steel (3-1/2"x3-1/2"x1/16"x full height), 1/8" radius Coner Guard.

B. Guest Rooms and Public Areas: High-impact polycarboante (1-1/2"x1-1/2"x1/16"x full height) solid color Coner Guard.

END OF SECTION

SECTION 10305

MANUFACTURED FIREPLACES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured steel box fireplace.

B. Accessories, including circulating fan.

C. Insulated chimney flue and associated roof flashings.

1.02 REFERENCES

A. UL 127 - Standard for Factory-Built Fireplaces; Underwriters Laboratories Inc.; 1996.

1.03 DESIGN REQUIREMENTS

A. Fuel: Natural gas specified in Section 15145.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide fire box cabinet dimensions, clearances required from adjacent dissimilar construction, applicable regulatory agency approvals, electrical characteristics of fan.

C. Shop Drawings: Indicate fire box rough opening dimensions, rough opening sizes for chimney flue, fan size.

D. Manufacturer's Certificate: Certify that fireplace components meet or exceed UL requirements.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for clearances from adjacent materials, chimney height above roof line requirements, and unit UL approval.

B. Listed by Underwriters Laboratories Inc. as complying with UL 127.

C. Products Requiring Electrical Connection: Listed and labeled by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufactured Fireplaces:
   1. Heat-N-Glo Fireplace Products, Inc: www.heatnglo.com.
   2. CFM Majestic Inc; Product Majestic SH48 vent-free fireplace: www.vermontcastings.com.
   3. Substitutions: See Section 01600 - Product Requirements.

2.02 COMPONENTS

A. Fire Box: Formed insulated steel cabinet, rectangular shaped interior, configured to include chimney outlet and cleanout, refractory brick lining and front air inlet and integral air outlet.

B. Exposed Cladding: Prepainted steel.

C. Controls: Rotating damper, 1/2 turn type.

D. Fire Box Closure: Clear tempered glass doors in black steel frame, butt hinged, friction catch.

2.03 ACCESSORIES

A. Fire Box Grate: Wrought steel.

B. Fasteners and Anchors: Galvanized steel type.

2.04 FACTORY FINISHING

A. Exposed to View Surfaces: Baked enamel; color as selected.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared openings are ready to receive work and opening dimensions are as indicated on drawings.

B. Verify that proper power supply and fuel source are available.

3.02 INSTALLATION

A. Install unit assembly in accordance with manufacturer's instructions and UL requirements.

END OF SECTION

SECTION 10350

FLAGPOLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum Flagpoles.

B. Electric operation.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete: Concrete base and foundation construction.

1.03 REFERENCES

A. AASHTO M 36 - Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains; American Association of State Highway and Transportation Officials; 2003.

B. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2006.

C. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2006.

D. ASTM B 241/B 241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2002.

1.04 PERFORMANCE REQUIREMENTS

A. Flagpole With Flag Flying: Resistant without permanent deformation to 100 miles/hr wind velocity; nonsafety design factor of 2.5.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pole, accessories, and configurations.

C. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads.

1.06 QUALITY ASSURANCE

A. Design flagpole foundation under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed the State in which the Project is located.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.

B. Protect flagpole and accessories from damage or moisture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Flagpoles:
   1. American Flagpole: www.americanflagpole.com.
   2. Substitutions: See Section 01600 - Product Requirements.

2.02 FLAGPOLES

A. Flagpole: Aluminum.
   1. Nominal Height: 30 ft; measured from nominal ground elevation.
   2. Mounting: Ground mounted type.
   3. Design: Cone tapered.
   4. Halyard: External type.

2.03 POLE MATERIALS

A. Aluminum: ASTM B221 (ASTM B 221M), 6063 alloy, T6 temper.

2.04 ACCESSORIES

A. Finial Ball: Aluminum, 6 inch diameter.

B. Truck Assembly: Cast aluminum; revolving, stainless steel ball bearings, non-fouling.

C. Flag: USA design, 5' x 8' inch size, Woven 2-ply spun polyester bunting fabric, brass grommets, hemmed edges.

D. Cleats: 9 inch size, aluminum with stainless steel fastenings, two per halyard.

E. Halyard: 5/16 inch diameter polypropylene, braided, white.

2.05 MOUNTING COMPONENTS

A. Foundation Tube Sleeve: AASHTO M 36M, corrugated 16 gage steel, galvanized, depth of 36 inches, as indicated.

B. Pole Base Attachment: Flush; aluminum base with base cover.

2.06 FINISHING

A. Metal Surfaces in Contact With Concrete: Asphaltic paint.

B. Aluminum: Anodized to 0.7 mil, dark bronze anodized color.

C. Finial: dark bronze anodized finish.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.

3.02 PREPARATION

A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

3.03 INSTALLATION

A. Install flagpole, base assembly, and fittings in accordance with manufacturer's instructions.

B. Electrically ground flagpole installation.

C. Fill foundation tube sleeve with concrete specified in Section 03300.

D. Install foundation plate and centering wedges for flagpoles base set in concrete base and fasten.

3.04 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1 inch.

3.05 ADJUSTING

A. Adjust operating devices so that halyard and flag function smoothly.

END OF SECTION

SECTION 10440

INTERIOR SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior signage of the following types:
   1. ADA compliant interior signage, with raised borders.
   2. Fire evacuation, area of rescue assistance and specialty signs.

1.02 REFERENCES

A. ANSI/ICC A117.1 - Accessible and Useable Buildings and Facilities; 1998.

B. ATBCB ADAAG - Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG); U.S. Architectural Transportation Barriers Compliance Board; 2004.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's descriptive literature.

C. Shop Drawings: List sign styles, lettering, locations and dimensions of each interior sign.

D. Selection Samples: One complete set of color chips representing manufacturer's full range of available colors.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with requirements of ANSI/ICC A117.1 and ADAAG.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inspect products upon receipt. Store products in manufacturer's packaging until ready for installation.

1.06 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Best Sign Systems; 1202 N. Park Avenue, P. O. Box 577, Montrose, CO 81402. ASD. TEL: (800) 235-BEST. FAX (970) 249-0223. Email: sales@bestsigns.com www.bestsigns.com.

2.02 INTERIOR SIGNS

A. ADA-Compliant Interior Signage with Raised Borders:
   1. Style: HC300 ADA System by Best Sign Systems.
   2. Type: Four-in one construction with raised borders; three-ply melamine plastic laminate with phenolic core signs with lettering and symbols raised 1/32 inch from sign plate face; and 3/8 inch wide, 1/32 inch raised perimeter border with 1/8 inch inside radius.
   3. Sign Thickness: 1/8 inch thick or 1/4 inch thick as required.
   4. Construction: One-piece; added-on or engraved characters not acceptable.
   5. Lettering Style: Standard Medium, upper case.
   6. Braille: Grade 2 Braille, placed directly below last line of letters or numbers.

7. Performance: Non-static, fire-retardant, and self-extinguishing.
8. Contrast: Letters numbers and symbols shall contrast with background.
9. Corners: Outside radius, 1/2 inch.
10. Color of Plastic: As selected from manufacturer's standard colors.
11. Finish of Plastic: Matte.
12. Color of Background: As selected from manufacturer's standard paint colors.
13. Letter and Number Sizes:
    a. Room numbers, 5/8 inch.
    b. Lettering for room usage and directional identification, 5/8 inch.
    c. Lettering for restroom identification, 5/8 inch high; corresponding symbols 3 inches high.
14. Sign Margins: Letters and numbers centered on sign.
15. Sign Sizes:
    a. Restroom signs, 6 by 8 inches
    b. Directional signs, 6 by 6 inches.
    c. Room identification signs, 10 by 3 inches.

B. Fire Evacuation, Area of Rescue Assistance and Specialty Signs:
1. Evacuation Plans Signs: 12 by 12 inches 'MP' plastic with copy and map engraved and paint-filled 2 standard paint colors. Full-size computer-ready artwork provided by Owner.
2. Maximum Capacity Signs: 12 by 6 inches 'MP' plastic with copy engraved and paint-filled one standard paint color.
3. Lettering Style: Typeface as selected, upper case.
4. Lettering Location: Centered on sign..
5. Braille: Grade 2 Braille, placed directly below last line of letters or numbers.
6. Corners: Square.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine installation areas to ensure that conditions are suitable for installation.

B. Examine signage for defects prior to installation. Do not install damaged signage.

3.02 PREPARATION

A. Verify mounting heights and locations for interior signage will comply with referenced standards.

B. Clean mounting locations of dirt, dust, grease or similar conditions that would prevent proper installation.

3.03 INSTALLATION

A. Install signs level, plumb, without distortion, and in proper relationship with adjacent surfaces using manufacturer's recommended standard mounting system.
1. Mounting: Mount with vinyl foam tape.

B. Remove adhesive from exposed sign surfaces as recommended by manufacturer.

C. Clean signs after installation as recommended by manufacturer.

D. Replace damaged products before Substantial Completion.

END OF SECTION

SECTION 10500

LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Locker units with hinged doors.

B. Metal tops and filler panels.

1.02 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; 2006a.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on locker types, sizes and accessories.

C. Shop Drawings: Indicate locker plan layout, numbering plan.

D. Samples: Submit two samples 3 x 6 inches in size, of each color scheduled; applied to specified base metal.

E. Manufacturer's Installation Instructions: Indicate component installation assembly.

1.04 DELIVERY, STORAGE, AND PROTECTION

A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Lockers:
   1. Art Metal Products: www.artmetalproducts.com.
   2. Lyon Workspace Products: www.lyonworkspace.com.
   3. Penco Products, Inc: www.pencoproducts.com.
   4. Republic Storage Systems Co: www.republicstorage.com.
   5. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Sheet Steel: ASTM A 653/A 653M SS Grade 33/230, with G60/Z180 coating, stretcher leveled; to the following minimum thicknesses:
   1. Body and Shelf: 24 gage, 0.024 inch.
   2. Door Outer Face: 16 gage.
   3. Door Frame: 16 gage, 0.060 inch.
   4. Hinges: 14 gage, 0.075 inch.
   5. Base: 12 gage.
   6. Sloping Top: 20 gage, 0.036 inch.
   7. Trim: 20 gage, 0.036 inch.

B. Accessories For Each Locker: Two single prong wall hooks, hat shelf.

2.03 LOCKER UNITS

A. Width: 12 inches.

B. Depth: 15 inches.

C. Height: 72 inches.

D. Configuration: double tier.

E. Mounting: Free standing.

F. Base: Metal base.
   1. Base Height: 4 inch.

G. Top: Sloped metal with closures.

H. Locking: Equipped for padlock hasps.

I. Ventilation Method: Door louvers.

J. Locker Body: Formed and flanged; with steel stiffener ribs; electric spot welded.

K. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.

L. Doors: Hollow channel edge construction, 1-3/16 inch thick; welded construction, channel reinforced top and bottom with intermediate stiffener ribs, grind and finish edges smooth.

M. Hinges: Two for doors under 42 inches high; three for doors over 42 inches high; weld securely to locker body and door.

N. Locking device supplied by Owner.

O. Number Plates: Provide oval shaped aluminum plates. Form numbers 1 inch high of block font style, in contrasting color.

P. Provide ventilation openings at top and bottom of each locker.

Q. Form recess for operating handle and locking device.

R. Finish edges smooth without burrs.

S. Fabricate sloped metal tops, ends and closure pieces.

T. Provide end panels and filler strips.

2.04 FINISHING

A. Clean, degrease, and neutralize metal; prime and finish with one coat of baked enamel.

B. Paint locker units 1 color, as selected.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install lockers plumb and square.

C. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 lb.

D. Bolt adjoining locker units together to provide rigid installation.

E. Install end panels, filler panels, and sloped tops.

F. Install accessories.

G. Replace components that do not operate smoothly.

3.02 CLEANING

A. Clean locker interiors and exterior surfaces.

END OF SECTION

SECTION 10523

FIRE EXTINGUISHERS, CABINETS & ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

C. Accessories.

1.02 RELATED SECTIONS

A. Section 06114 - Wood Blocking and Curbing: Wood blocking and shims.

B. Section 09900 - Paints and Coatings: Field paint finish.

1.03 REFERENCES

A. NFPA 10 - Standard for Portable Fire Extinguishers; National Fire Protection Association; 2007.

B. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.04 PERFORMANCE REQUIREMENTS

A. Conform to NFPA 10.

B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide extinguisher operational features and color and finish.

C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Extinguishers, Cabinets and Accessories:
   1. JL Industries, Inc: www.jlindustries.com.
   2. Larsen's Manufacturing Co: www.larsensmfg.com.
   3. Potter-Roemer: www.potterroemer.com.
   4. Fire End & Croker Corporation.www.croker.com
   5. Substitutions: Not permitted.

2.02 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
   1. Provide extinguishers labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

B. Dry Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gage.
   1. Class 4A-60BC.
   2. Size 10.
   3. Finish: Baked enamel, red color.
   4. Manufacture/Model: JL Industires / Cosmic 10E

2.03 FIRE EXTINGUISHER CABINETS

A. JL Industries Non-Fire-Rated Extinguisher Cabinets: Cosmopolitan Series Model #1037W10 with 3" return trim or acceptable alternate located in non-rated walls.

B. JL Industries Fire-Rated Extinguisher Cabinets: Cosmopolitan Series Model #1037W10FX with 3" return trim or acceptable alternate located in 1-hour rated walls.

C. JL Industries Fire-Rated Valve Cabinets: Crownline Model #8037W10FX with 2-1/2’ return trim.

D. JL Industries Non-Fire-Rated Valve Cabinets: Crownline Model #8037W10 with 2-1/2’ return trim.

E. Metal: Formed stainless steel sheet; 0.036 inch thick base metal.

F. Cabinet Configuration: Semi-recessed type.
   1. Sized to accommodate accessories.
   2. Trim: Flat, 3 or 2-1/2 inch wide face.

G. Door: 0.036 inch thick, reinforced for flatness and rigidity; latch. Hinge doors for 180 degree opening with continuous piano hinge. Provide nylon catch.

H. Door Glazing: Plastic, clear, 1/8 inch thick acrylic. Set in resilient channel gasket glazing.

I. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.

J. Weld, fill, and grind components smooth.

K. Finish of Cabinet Exterior Trim and Door: No. 4.

L. Finish of Cabinet Interior: White enamel.

2.04 ACCESSORIES

A. Extinguisher Brackets: Formed steel, chrome-plated.

B. Cabinet Signage: JL Industries Decal #16 on Fire Extinguisher Cabinets & #8 on Valve Cabinet.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings, 48 inches from finished floor to extinguisher handle.

C. Secure rigidly in place.

D. Place extinguishers in cabinets.

3.03 SCHEDULES

A. Wall Mounted (Bracket Supported) Fire Extinguishers: Install fire extinguishers in areas and quantity as required by local codes and ordinances. Wall brackets shall be anchored solidly to wall. Block walls where required in order to obtain a rigid installation. Mount so that fire extinguisher handle is no higher than 4'-O" above finish floor. Install bracket-mounted fire extinguishers in the following locations:
   1. Mechanical Rooms
   2. Electrical Rooms
   3. Boiler Rooms
   4. Storage Rooms
   5. Maintenance Room
   6. Laundry
   7. Elevator Equipment Room
   8. Administrative Work Area

B. Cabinet Installation:
   1. Install cabinets in locations indicated on the Drawings.

END OF SECTION

SECTION 10651

OPERABLE PANEL PARTITIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Acoustic operable panel partition.

B. Ceiling track, ceiling guards, and operating hardware.

1.02 RELATED SECTIONS

A. Section 05100 - Structural Steel: Overhead track structural support framing.

B. Section 06100 - Rough Carpentry: Wood blocking and track support shimming.

C. Section 07900 - Joint Sealers: Acoustical sealant.

D. Section 09900 - Paints and Coatings: Field applied paint finish to panels.

E. Section 09720 - Wall Covering: Product requirements for vinyl fabric finish for installation by this section.

F. Related work by others:
   1. Section : Masonry/Concrete.
   2. Section : Metal framing and gypsum board wall systems other than over the operable wall partitions.
   3. Section : Primary structural support, including pre-punching of support members by structural steel supplier per operable wall supplier's template.
   4. Section : All heads, blocking, jambs, track enclosures, surrounding insulation and sound baffles.
   5. Section : Painting of trim, gypsum drywall and other adjacent materials.

1.03 REFERENCES

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2007.

B. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2004.

C. ASTM E 413 - Classification for Rating Sound Insulation; 2004.

D. ASTM E 557 - Standard Guide for The Installation of Operable Partitions; 2000 (Reapproved 2006).

E. ASTM E 596 - Standard Test Method for Laboratory Measurement of Noise Reduction of Sound-Isolating Enclosures; 1996 (Reapproved 2002).

F. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on partition materials, operation, hardware and accessories, and colors and finishes available.

C. Shop Drawings: Indicate opening sizes, track layout, details of track and required supports, and stacking depth.

D. Samples for Selection: Submit two samples of full manufacturer's color range for selection of colors.

E. Samples for Review: Submit two samples of surface finish, 12 x 12 inches size, illustrating quality.

F. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention, and installation sequence.

G. Certificates: Certify that partition system meets or exceeds specified acoustic requirements.

H. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods. Describe cleaning materials detrimental to finish surfaces and hardware finish.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of this section with minimum three years of experience.

1.06 PROJECT CONDITIONS

A. Coordinate the work with other sections providing panel finish materials to this section.

B. Coordinate installation of electric service.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Other Acceptable Manufacturers:
   1. Hufcor, Inc: www.hufcor.com.
   2. Modernfold, Inc; Product Acousti-Seal 933 continuously hinged operable wall: www.modernfold.com.
   3. Panelfold, Inc: www.panelfold.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 COMPONENTS

A. Operable Panel Partition: Side opening; continuous hinged panels; center stacking; manually operated.
   1. Panel Finish: Customer's own material, subject to factory approval and compliance to ASTM E84 for a Class A interior finish.
   2. Noise Reduction Coefficient (NRC): ASTM E 596, NRC of 0.65 minimum.
   3. Sound Transmission Class (STC): 54 calculated in accordance with ASTM E 413, based on tests conducted in accordance with ASTM E 90, on panel size of 100 sq ft.
   4. Surface Burning Characteristics of Panel Finish: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E 84.
   5. Installed partition system track capable of supporting imposed loads, with maximum deflection of 1/360 of span.

B. Panel Construction:
   1. Panel Substrate Facing: Steel sheet, 21-gage.

C. Core: 21 gage formed sheet steel frame top, bottom, jambs, and intermediates; welded construction, internally reinforced at suspension points, with acoustical insulation fill.
   1. Thickness with Finish: 3 1/4 inches.
   2. Factory applied surface finish. Customer's own material, subject to factory approval.

3. Hinges: Continuous piano type, 18 gage stainless steel.
4. Panel to Panel Seals: Grooved and gasketed astragals; continuous flexible ribbed vinyl seal fitted to panel edge construction; color to match panel finish.

D. Track: Formed steel; 1-5/8 x 1-5/8 inches size; thickness and profile designed to support loads, steel sub-channel and track connectors, Moderfold #14 Suspension System.

E. Carriers: Ball bearing, steel wheels on trolley carrier at top of every second panel, sized to carry imposed loads, with threaded pendant bolt for vertical adjustment.

F. Hardware: Latching door handles of cast steel, satin chrome finish; lock cylinder keyed to building keying system; pull bars; .

G. Acoustic Seals: Flexible acoustic seals at jambs, meeting mullions, ceilings, retractable floor and ceiling seals, and above track to structure acoustic seal.

H. Accessories: White enameled ceiling closure; aluminum jamb and head molding, fittings and attachments,.

I. Pocket Enclosures: Door, frame, and trim to match adjacent walls.

J. Acoustic Sealant: Specified in Section 07900.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that required utilities are available, of the correct characteristics, in proper location, and ready for use.

C. Verify track supports are laterally braced and will permit track to be level within 1/4 inch of required position and parallel to the floor surface.

D. Verify floor flatness of 1/8 inch in 10 feet, non-cumulative.

E. Verify wall plumbness of 1/8 inch in 10 feet, non-cumulative.

3.02 INSTALLATION

A. Install partition in accordance with manufacturer's instructions and ASTM E 557.

B. Fit and align partition assembly and pocket doors level and plumb.

C. Lubricate moving components.

D. Apply acoustic sealant to achieve required acoustic performance.

3.03 ADJUSTING

A. Adjust partition assembly to provide smooth operation from stacked to full open position. Do not over-compress acoustic seals.

B. Visually inspect partition in full extended position for light leaks to identify a potential acoustical leak.

C. Adjust partition assembly to achieve lightproof seal.

3.04 CLEANING

A. Clean finish surfaces and partition accessories.

3.05 DEMONSTRATION AND INSTRUCTION

A. Demonstrate operation of partition, identify potential operational problems.

3.06 SCHEDULES

A. See Architectural drawings for locations.

END OF SECTION

SECTION 10800

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Accessories for toilet rooms, showers, and utility rooms.

B. Grab bars.

1.02 RELATED SECTIONS

A. Section 06114 - Wood Blocking and Curbing: Concealed supports for accessories, including in wall framing and plates and above ceiling framing.

B. Section 08830 - Mirrors: Other mirrors.

C. Section 09300 - Tile: Ceramic washroom accessories.

D. Section 10165 - Plastic Laminate Toilet Compartments.

1.03 REFERENCES

A. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.

B. ASTM C 1036 - Standard Specification for Flat Glass; 2006.

C. GSA CID A-A-3002 - Mirrors, Glass; U.S. General Services Administration; 1996.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

1.05 COORDINATION

A. Coordinate the work with the placement of internal wall reinforcement to receive anchor attachments.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Other Acceptable Manufacturers:
   1. A & J Washroom Accessories Inc: www.ajwashroom.com.
   2. American Specialties, Inc: www.americanspecialties.com.
   3. Bradley Corporation: www.bradleycorp.com.
   4. Substitutions: Section 01600 - Product Requirements.

B. All items of each type to be made by the same manufacturer.

2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
   1. Grind welded joints smooth.
   2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

B. Keys: Provide two keys for each accessory to Owner; master key all lockable accessories.

C. Stainless Steel Sheet: ASTM A 666, Type 304.

D. Mirror Glass: Float glass, ASTM C 1036 Type I, Class 1, Quality Q2, with silvering, copper coating, and suitable protective organic coating to copper backing in accordance with GSA CID A-A-3002.

E. Adhesive: Two component epoxy type, waterproof.

F. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, security type.

G. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

B. Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 TOILET ROOM ACCESSORIES

A. See Schedule on drawings.
   1. Schedule will list manufacture and model number of each toilet room accessory and will supercede any listed accessory in this section of the specifications.

B. Mirrors: Stainless steel framed, 6 mm thick float glass mirror.

C. Grab Bars: Stainless steel, 1-1/2 inches outside diameter, minimum 0.05 inch wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
   1. Length and configuration: As indicated on drawings.

D. Baby changing stations: Stainless steel recessed horizontal changing station model# KB110-SSRE as manufacturered by Kola Kare Products a DIvision of Bobrick installed per ADA mounting height. See drawings for locations in Public Restrooms and / or areas noted on the dawings.

E. Electric Hand Dryer: Sloan Optima Accessories Model# EHD-501-CP as manufacturered by Sloan Valve Company. Call out on drawings TA-19.

2.05 SHOWER AND TUB ACCESSORIES

A. Shower Curtain Rod: Stainless steel tube, 1 inch outside diameter, 0.04 inch wall thickness, satin-finished, with 3 inch outside diameter, minimum 0.04 inch thick satin-finished stainless steel flanges, for installation with exposed fasteners.

2.06 UTILITY ROOM ACCESSORIES

A. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, with 1/2 inch returned edges, 0.06 inch steel wall brackets.
   1. Drying rod: Stainless steel, 1/4 inch diameter.
   2. Hooks: 2, 0.06 inch stainless steel rag hooks at shelf front.
   3. Mop/broom holders: 3 spring-loaded rubber cam holders at shelf front.
   4. Length: Manufacturer's standard length for number of holders/hooks.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

END OF SECTION

SECTION 11131

PROJECTION SCREENS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Front projection screen assemblies.

B. Universal Projector Mount

1.02 RELATED SECTIONS

A. Section 09511 - Suspended Acoustical Ceilings: Suspended panel ceilings for recessed screens.

B. Section 16155 - Equipment Wiring: Electrical supply, conduit, and wiring for electric motor operated projection screens.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's catalog cuts and descriptive information on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Wiring diagrams for motor operators and actuators, and controls and switches.

C. Operation and Maintenance Data: Provide manufacturer's operation and maintenance instructions.

D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Experienced in manufacturing products specified in this section.

B. Installer Qualifications: Experienced in installation of the work of this section.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Deliver projection screens to project site in manufacturer's original unopened packaging. Inspect for damage and size before accepting delivery.

B. Store in a protected, clean, dry area with temperature maintained above 50 degrees F. Stack according to manufacturer's recommendations.

C. Acclimate screens to building temperatures for 24 hours prior to installation, or in accordance with manufacturer's recommendations.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Maintain interior of building between 60 degrees F and 75 degrees F during and after installation of projection screens.

1.07 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Provide 5 year manufacturer warranty for projection screen assembly.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Bretford: www.bretford.com.

B. Da-Lite Screen Company: www.da-lite.com.

2.02 FRONT PROJECTION SCREENS

A. Manufacturers:
   1. Bretford: www.bretford.com.
   2. Da-Lite Screen Company: www.da-lite.com.
   3. Draper, Inc: www.draperinc.com.

B. Front Projection Screens: Factory assembled unless otherwise indicated.
   1. Dimensions: As indicated on drawings.

C. Glass Beaded Light Refracting Fabric: Glass beads on textile backing; flame retardant and mildew resistant.
   1. Material: High resolution, high contrast glass beaded vinyl without backing, with nominal gain of 2.8 on axis, not less than 1.4 at 25 degrees from axis.
   2. Seams: No seams permitted in fabric up to 120 inches high by 72 inches wide.

D. Concealed-in-Ceiling Screen Cases: Steel; integral roller brackets.
   1. Door Slat: Self trim; self-closing and -opening.
   2. Case Finish: Baked enamel.
   3. Case Color: White.
   4. End Caps: Steel; finished to match case.

E. Electrically-Operated Screens:
   1. Roller: 2 inch aluminum, with locking device.
   2. Vertical Tensioning: Screen fabric weighted at bottom with steel bar with plastic end caps.
   3. Horizontal Tensioning: Tab-guided cable system.

F. Provide mounting hardware, brackets, supports, fasteners, and other mounting accessories required for a complete installation, in accordance with manufacturer's recommendations for specified substrates and mountings.

G. Projector Mount: Provide model PBC-UMW Universal Projector Mount as Manufacturered by Premier Mounts (www.mounts.com). See drawings for location and detail of attachment to structure.

2.03 ELECTRICAL COMPONENTS

A. Electrical Components: Listed and classified by UL as suitable for the purpose specified and indicated.

B. Motors: Direct drive, 110 V, 60 Hz.
   1. Screen Motor: Mounted inside roller; three wire with ground; quick reverse type; equipped with thermal overload cut-off.
      a. Electrical Characteristics: 1.2 amps.
      b. Motor mounted on sound absorber.

C. Controls: 3 position control switch with plate.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate is finished and ready to accept screen installation.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that openings for recessed screens are correctly sized.

D. Verify type and location of electrical connections.

E. Do not install projection screens until climate control systems are in place and interior painting and other finishes are completed.

3.02 PREPARATION

A. Coordinate screen installation with installation of projection systems.

B. Coordinate installation with adjacent construction and fixtures, including ceilings, walls, lighting, fire suppression, and registers and grilles.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, using manufacturer's recommended hardware for relevant substrates.

B. Do not field cut screens.

C. Install screens in mountings as specified and as indicated on drawings.

D. Install plumb and level.

E. Install electrically operated screens ready for connection to power and control systems by others.

F. Adjust projection screens and related hardware in accordance with manufacturer's instructions for proper placement and operation.

G. Test electrical screens for proper working condition. Adjust as needed.

3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch up, repair, or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 11400

FOOD SERVICE EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Food service equipment.

B. Connections to utilities.

1.02 RELATED SECTIONS

A. Section 07900 - Joint Sealers.

1.03 REFERENCES

A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2005.

B. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association; 2004.

C. UL (EAUED) - Electrical Appliance and Utilization Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on appliances; indicate configuration, sizes, materials, finishes, locations, and utility service connection locations, service characteristics, and wiring diagrams.

C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

D. Operation Data: Provide operating data for the specified equipment.

E. Submit approved (by local Authority Having Jurisdiction, State Fire Marshalls and State/Local Health Deparment as applicable) shop drawings and cut sheets to each trade involved in the rough-in and final connections to the equipment.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for utility requirements.

B. Products Requiring Electrical Connection: Listed and classified by UL (EAUED) as suitable for the purpose specified and indicated.

1.06 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Store products clear of floor in a manner to prevent damage.

B. Coordinate size of access and route to place of installation.

1.08 PROJECT CONDITIONS

A. Coordinate the work with location and placement of utilities. Coordinate characteristics of utilities with requirements of food service equipment.

B. Schedule work of this section to follow immediately the installation of utilities.

C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

PART 2 PRODUCTS

2.01 MATERIALS

A. Food Service Equipment: Provide by the Owner, assembled and set into place by the Owner's Vendor and rough-ins and final connnections by the Contractor.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify ventilation outlets, service connections, and supports are correct and in required location.

B. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

A. The equipment vendor shall uncrate, assemble, erect and set into place each piece of equipment. Respective Sub-Contractors (Plumbing, Ventilating and Electrical), shall properly connect each item of food service equipment and put same into operation. Vendor will verify that each piece of equipment has been properly installed and connected and is ready for operation.

B. The equipment vendor shall return to the job site after installation is complete to verify proper installation and to perform “startup” and “test” of each piece of equipment.

C. Install items in accordance with manufacturers' instructions.

D. Insulate to prevent electrolysis between dissimilar metals.

E. Provide sealant to achieve clean joint with adjacent building finishes and between abutting components.

3.03 ADJUSTING

A. Adjust equipment and apparatus to ensure proper working order and conditions.

B. Remove and replace equipment creating excessive noise or vibration.

3.04 CLEANING

A. Remove masking or protective covering from stainless steel and other finished surfaces.

B. Wash and clean equipment.

C. Polish glass, plastic, hardware, accessories, fixtures, and fittings.

3.05 DEMONSTRATION AND INSTRUCTIONS

A. Test equipment prior to demonstration. Demonstrate operation of components scheduled.

B. At completion of work, provide qualified and trained personnel to demonstrate operation of each item of equipment and instruct Owner in operating procedures and maintenance.
   1. Individual Performing Demonstration: Fully knowledgeable of all operating and service aspects of equipment.

3.06 PROTECTION OF FINISHED WORK

A. Remove protective coverings from prefinished work.

END OF SECTION

SECTION 11451

APPLIANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Includes installation and final connection of all Owner-furnished appliances.

1.02 RELATED SECTIONS

A. Section 06415 - Cabinetry and Millwork: Coordination of the installations the cabinet tops with the appliances. Coordination of cut-outs for appliances.

B. Division 15 - Mechanical: Rough-ins and final connections

C. Division 16 - Electrical: Rough-ins and final connections

1.03 QUALITY ASSURANCE

A. All electrical equipment shall have UL labels,

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Shipment of appliances shall be scheduled so that it does not arrive at the job site before adequate storage facilities have been prepared. All items shall arrive at the job site in manufacturers original crates. All items shall be examined for shipping damage at this time in the presence of the Owners Representative. Any damages shall he reported immediately to the Architect. The General Contractor shall be responsible for unloading, inspecting and providing adequate storage for this equipment.

PART 2 PRODUCTS

2.01 APPLIANCES

A. Appliances: Provide by the Owner, assembled and set into place by the Owner's Vendor and rough-ins and final connnections by the Contractor.

B. Appliances: Refer to Drawings for appliances and their locations.

PART 3 EXECUTION

3.01 INSTALLATION

A. Verify that rough-in requirements have been completed and are of the correct capacity, voltage. etc., prior to installation and connection of any appliance item.

B. Set into place each piece of equipment. Respective Sub-Contractors (Plumbing, Ventilating and Electrical), shall properly connect each item or appliance and put same into operation. Vendor shall verify that each piece of equipment has been properly installed and connected and is ready for operation.

C. Final installation and connection of the appliances shall meet all local health code requirements.

D. The equipment vendor shall return to the job site after installation is complete to verify proper installation and to perform “startup’ and test’ of each piece of equipment.

3.02 CLEANING

A. All appliances shall be thoroughly cleaned and polished, inside and outside, ready for Owner’s use. Moving parts shall be lubricated as required, water faucets and strainers shall be cleaned and in perfect operating conditions; replace if necessary.

3.03 PROTECTION

A. Protect completed installations from damage until date or Substantial Completion. Replace damaged items with new products. Damaged or marred surfaces shall be refinished to “like new” condition. Surfaces that can not he repaired or restored shall be replaced.

END OF SECTION

SECTION 13150

SWIMMING POOL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Includes furnishing materials, labor and equipment required for the construction of the swimming pool and Spa (where the spa occurs) and the furnishing and installation of all pool/spa and related equipment. Also, includes initial swimming pool/spa chemical supply and startup. Note: This section is also applicable for the Spa where shown in the Contract Documents.

B. Construction to be provided by the Pool Contractor:
   1. Building Permit for all pool work.
   2. Excavation for pool structure, disposal of excess excavated material either off-site or stockpiled on site for handling by others.
   3. Reinforced concrete pool structure for normal ground conditions and pneumatically-applied (gunite) concrete walls and floor.
   4. Marcite white plaster interior pool finish with ColorquarizTM aggregate added to the finish plaster coat.
   5. One row of 6” wide frostproof ceramic tile at waterline of pool and ceramic tile depth markers at pool. Refer to Paragraph 2.02 for additional marking requirements.
   6. Non-slip, pre-cast concrete coping, white in color, profile as detailed.
   7. Non-slip concrete steps where indicated,
   8. Swimming pool recirculation system, piping of Schedule 40, NSF approved PVC with solvent weld fittings, brass hall valves.
   9. Heater for swimming pool.
   10. All safety equipment required by the State and local Health Department.
   11. Pressure relief equipment for groundwater hydrostatic pressure.

C. Preparatory work and work performed by other trades in conjunction with the swimming pool construction shall he performed as specified in other sections of this Project Manual, shall conform to health department requirements and the requirements of other governing agencies, and shall consist of the following:
   1. Concrete deck with non-slip finish sloped 1/4” per foot to deck drains as required by local codes and ordinances; refer to Section 03300.
   2. Expansion joints with sealant at pool coping and deck.
   3. All site grading, clearing leveling, filling, compacting.
   4. Removal of all existing underground appurtenances in pool area.
   5. Coordination of setting of deck equipment in deck.
   6. Pool equipment enclosure.
   7. Plumbing:
      a. Pool catch basin construction, as required by local codes and ordinances.
      b. 4” pipe opening in filter extended to catch basin for backwash disposal.
      c. Sewer work for backwash, deck drainage, etc.
      d. Water to and connection to fillspout with shut off and winterizing valves with access boxes as required.
      e. Backflow prevention on all connections to pools from domestic water system.
      f. Deck drainage system.
      g. Electrical: All wiring. switching, controls, disconnects, starters, pump motors, underwater lighting, grounding of pool and accessories to be installed and connected as per code. Pool contractor shall furnish underwater lighting, two (2) 300 watt at pool, 12 volt, with a one-piece cord and PVC conduit stub-out and weatherproof transformer; installation of transformer by electrical contractor. Room equipment exhaust shall be in General Contract.

h. Water and electricity in pool area for construction purposes.
i. Access to the pool area to allow operation of normal construction equipment.

1.02 QUALITY ASSURANCE

A. All work under this Section must be performed by a Contractor experienced and regularly engaged in building, commercial swimming pools. Contractors bidding this work must have completed five (5) projects within the past ten years equal to or larger than this project.

B. Pool specification and related pool drawings are to he considered as performance guidelines only meeting minimum requirements which may change as result of local code and health department requirements.
1. The project Drawings and Project Manual supplement each other. In the event of a conflict, the Specifications shall govern. Piping locations are schematic. Precise locations of piping shall be determined by actual field condition. Fittings are not shown. The Pool Contractor shall include all fittings normally required for a completed system.
2. This Contractor shall be responsible for reviewing the complete set of Contract Documents and coordinate work with other trades.

C. All work under this Section shall be inspected and installed in accordance with all current local and State codes and regulations.
1. The Pool Contractor shall obtain the following:
a. Board of Health Design Approvals
b. State Hoard of Health Inspections and Final Approval
c. Structural and Electrical Inspections and Final Approvals on his Portion of the Work

D. Pool Contractor to be responsible for design and installation of pools, including layouts, routing of piping, as well as the proper location and quantities of required accessories. Responsibilities also include necessary valves, devices, and controls for pool system as required.

E. Contractor's design drawings must be sealed and signed by a licensed Engineer registered in the State in which project is being constructed.
1. Contractor shall submit, on his letterhead, a list of all variations and deviations he finds that differ between local code requirements and bid drawings.

1.03 SUBMITTALS

A. Product Data:
1. Manufacturer's technical literature with installation and storage instructions for each product specified.
2. Pumps: Pump performance curves indicating GPM vs TDH, maximum efficiency point, and amperage draw, together with current characteristics and service factor of motor.

B. Shop Drawings
1. Submit the following Shop Drawings to the Architect in accordance with Section 01300:
a. Complete design of swimming pool, including all component parts, attachments, devices, or other work, filtration filter, size, turn-over capacity, and supporting calculations.
b. Foundation plan and details and Sections through pool shall be included.
c. Mechanical schematic.
d. Detail for ladder and pool wall interface.
e. Show all shop erection details.
f. All Shop Drawings shall be certified and sealed by a Professional Engineer, registered in the State in which project is being submitted.
g. The pool manufacturer shall certify to the Owner that the depth and configuration of the pool is acceptable and compatible with all known safety standards for the manufacturers designed product.

C. Instruction Manuals: The Contractor shall furnish to the Owner copies of printed operation and maintenance instructions as called for in Section 01700 and 01780.

D. Quality Control:
   1. Design Data:
      a. Hydraulic analysis: Engineer's sealed calculations and total dynamic head (TDH) for swimming pool system for equipment other than that specified.
      b. Structural analysis: Engineer's sealed calculations and analysis for pool concrete design.

E. At the completion of the work, the Pool Contractor shall furnish to the Owner two bound copies of an operation manual in accordance with Sections 01700 and 01780. Minimum content of these manuals shall be:
   1. Operating Instructions
   2. Equipment Literature with Parts List of all Equipment
   3. Water Chemistry Procedures
   4. Suggested Safety Procedures
   5. Repainting/Refinishing Procedures
      a. Include chemical analysis of source/make-up water supply
         1) Copies of all manufacturer's warranties
         2) Test reports
         3) Sealed Engineer's drawings.
         4) Certificates: From local authorities indicating that pool construction and performance conform to requirements of respective authorities.

F. At the completion of the work, the Pool Contractor shall fill the pool with water and instruct the Owners operating personnel in the operation of all equipment.
   1. The Pool Contractor shall test the Owner's natural water supply and furnish and supply start-up chemicals as required for start-up, including chlorine and requirements to balance total alkalinity and calcium hardness, and shall obtain same.

1.04 JOB CONDITIONS

A. Protection: Protect adjacent areas and construction from damage due to his construction means, methods and workmen. All patching and repairing to adjacent surfaces or areas shall be performed by the trade who originally installed the work with costs of same being borne by the pool contractor.

B. Coordination: Coordinate this work with the work of other Sections to avoid any delay or interference with other work,
   1. Filter room, decks, sealing of joints between pool and deck, shall be provided as work by other Sections.
   2. Connection of all pool equipment, starters and switches; grounding of pool, pool equipment, pool lights and niches, and wiring of pool lights shall be performed by the Electrical Subcontractor from electrical panel in equipment room.
   3. Connection of floor drains, deck drains and hose bibs shall he provided as work of other Sections.
   4. Provisions for combustion air will be provided as work by other Sections.
   5. Connection of automatic water fill system and fill spout cold water lines from water source in equipment room shall be performed by Pool Subcontractor.

C. Lines, Grades, and Elevations: The Contractor shall establish a bench mark for elevations and control points for measurements and layouts. The Pool Contractor shall be responsible for lines, grades, and measurements from these points required for the installation of the pool.

D. Utilities: The Contractor shall supply the water required for construction and filling and testing of the pool from permanent accepted system.

1.05 GUARANTEE

A. Guarantee to the Owner all work performed under this contract to be free from defects in workmanship and materials for a period of one year from date of Substantial Completion. Defects arising in the pool structure circulating system, etc. during this period shall be promptly remedied by the Contractor upon notice by the Owner, without additional cost to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. All materials and equipment shall be new, free from defects, of first quality and entirely suitable for the intended service. Materials and equipment used in this work which are subject to approval by such agencies as UL, AGA, ASME, NSF, etc., shall bear the appropriate label or stamp of approval.

B. Schedule of Pool Equipment, Pool Fittings and Deck Equipment:
   1. The pool shall have a filtration and piping system. Pressure type filtration plants, NSF approved, with self-priming pump, integral hair and lint strainer, extra strainer basket. Provide pump and filter with capacity to meet local code requirements for a 6-hour swimming pool turnover or as required by local health department if more stringent. Diaphragm type pumps will not be acceptable. All valves shall he bronze hall valves. Piping used in vacuum lines, recirculation lines and drain lines shall be PVC-I High- Impact, Schedule 40 with PVC solvent weld fittings. Face piping shall be Schedule 40 PVC. Face piping shall include all piping between the discharge side of the circulating water pump and the discharge point of the backwash line and the connection of the return line to the pool.
   2. The pool shall have a chlorinator system. Chlorinator - liquid chlorination or brominator. Provide “Soaker Type” chemical feeders approved by National Sanitation Foundation. Hypochlorinators will not he acceptable. Acceptable manufacturer are Bio-Lab or as approved by the Architect.
   3. Water testing kit for chlorine and pH readings, Guardex 4 in 1 set.
   4. Thermometer, U with lanyard.
   5. Automatic Surface Skimmers, NSF approved.
   6. Pool Fittings:
      a. Pool Wall Inlet: Swimquip #8429.
      b. Auto Water Level Control: Rec-Reonics #32-550
      c. 1-1/2” Hydrostat Valve: Frost #41452.
      d. 1-1/2” Hydrostat Tube: Swimquip 7017-157.
         1) 1” Fill Spout: Frost #41240.
         2) Pool Main Sump: Sta-rite #7017-0103.
         3) Pool Main Drain: Sta-rite #70l7-074l.
      e. Underwater Lights:
         1) Two (2) 300W/12V Light at Pool: Hayward 64 Series with required transformer(s).
         2) Deck Junction Box - 3H: American Products #783102.

f. Deck Equipment:
   1) Grab Rail: Swan Manufacturing #S-100B.
   2) Deck Anchor: Swan Manufacturing IAS-l00.
   3) Escutcheon Plate: Swan Manufacturing #IEP-l0O.
   4) Ladder, 3 Tread: Swan Manufacturing #LFB-24-3B.
   5) Handicapped Lift. - Aquatic Access Inc Model IGAT-90: In-ground installation in deck socket, portable (lift out and roll away), automatic 90-degree seat turn, vertical seat travel of 42", independent operation, unit shall be powered by water pressure piped under the pool deck and connected to the unit, lifts up to 400-lbs at 55-psi while operating, which equals approximately 60-psi static pressure when measured at the connection. The mast arm, boom arm and connecting arm shall be stainless steel. Provide with deck sleeve.

g. Maintenance Equipment:
   1) Vacuum Cleaner Head: Rainbow Flex-A-Vacuum, Swivel Wheel.
   2) Vacuum Nose: Spiralock 1-1/2x35, heavy-duty.
   3) Vacuum Pole: Rainbow #812-16, 8'-16'.
   4) Utility Pole: Frost #40177-2.
   5) 18” Wall Curved Brush: A & B brush #6001900
   6) Algae Brush: A & B Brush #512/912.
   7) Pole Adapter: Frost #41420 with brass bolts and wing nuts.
   8) Leaf Net: Recreonics #10-105 with 12 long aluminum handle.

h. Safety Equipment:
   1) Life Hook: Rainbow #153, double arm.
   2) Life Hook Pole: Rainbow #820-16.
   3) Life Hook Pole Adapter: Frost #41420 with brass bolts and wing nuts.
   4) Life ring (provide 1) that has a United States Coast Guard (USCG) approval. The life ring shall be attached to a minimum 3/16” diameter line. The length of the life line shall he greater than the greatest width of the pool.

i. Spine board with ties.
j. 16 Unit first aid kit.
k. Vacuum Gauge for Pump Suction.
l. Pressure Gauge at Filter.
m. Vacuum wall fitting with plug.
n. Fill water for pool to be added to pool at face piping in Mechanical Room via backflow preventer and taps to face piping. Backflow preventer and water to same by Plumbing Contractor.
o. Main Drain Frame and Grate, Cycolac. 12” x 12” size.
p. Hydrostatic Relief Valve assembly, 2” size.
q. Depth Marking Tiles (numbered tiles) at waterline and recessed in the coping in the plane of the deck; show 3-FT, 4-FT, 5-FT etc at depth intervals of 12-inches spaced at varous locations around the pool/whirlpool perimeter. Provide “No-Diving” and step marker tiles. Step marker tiles shall be 2”x2” unglazed ceramic mosaic, color as selected by the Interior Designer.
r. Valve Tags.
s. Provide a sign as directed by the Architect, with all pool rules and code requirements which are required to be displayed to swimmers. The design and wording shall be as directed by the Owner.
t. Start up chemicals and start up of pool system.

C. Heater: Acceptable manufacturers are Teledyne Larrs or Raypak.
   1. Size: Design of the heater shall be based on maintaining a temperature or 80Th. Acceptable manufacturer is Raypack.
   2. Heater shall be A.S.M.E. coded and labeled.

3. Furnish and install at inlet and outlet of the heater an in-line thermometer with 3" face, 2-1/2" length, stainless steel case (shatterproof) with 1 degree F intervals and a minimum range of 0-180 degrees F, with brass thermometer wells.

D. Provide an adequate quantity of chlorine for swimming pool startup.

E. Concrete and reinforcing steel shall be as called for in Section 03300, Cast-In-Place Concrete. All concrete shall have a minimum 3,000-psi compressive strength in 28 days

F. Provide all steel frame supports, inserts, anchor bolts, sleeves, hanger materials, etc., for the adequate and safe support of piping and equipment. Concrete pads will be provided by the General Contractor.

G. Provide vibration isolation bases, housekeeping pads and elements for all equipment.

2.02 MARKINGS

A. Diving restrictions shall be painted on all pool copings / decks with letters that are a minimum 4" in height.

B. Pool depths shall be marked on the pool coping / deck at various locations around the perimeter of the pool at reasonable intervals and at every 12" of the pool depth gauge.

C. Marking shall also be on the vertical sides of the pool above the normally maintained water level.

D. Lettering shall be at least 4" high and identify the pool depth. Pool shall be marked in English.

2.03 CONCRETE

A. Definitions:
1. Gunite: Dry-mix. Originally a trade name used to designate a mixture of Portland cement and sand thoroughly mixed dry, passed through a cement gun and conveyed by air through a flexible tube, hydrated at the nozzle and placed by air pressure.
2. Shotcrete: Wet-mix, transit-mix (ready-mix) combination or Portland cement, aggregates and water, pumped in a plastic state to the nozzle, where air is added to place the material.
3. Materials and mixes for Guniteu and Shotcrete shall conform to GCA publication 0-84.
4. Gunite:
a. Aggregate: ASTM C 33, washed sand; clean, hard, sharp particles, well graded in size within the following limits:

	Size	Percent by Weight
1)	Passing through 3/8 inch screen	00
2)	Passing through No. 4	95 to 100
3)	Passing through No. 8	65 to 90
4)	Passing through No. 16	45 to 75
5)	Passing through No. 30	30 to 50
6)	Passing through No. 50	10 to 22
7)	Passing through No. 100	2 to 8

8) Mix one part cement to 4 1/2 parts of sand based on dry, loose volume (minimum 3,000-psi compressive strength in 28 days).
9) Portland cement and water: As specified hereinafter.
b. Shotcrete:
1) Transit mix (ready-mix) materials conforming to aggregate specified above for "Gunite" and with the additional following grading for pea gravel:

	Sieve Size	Percent by Weight
(a)	1/2"	100
(b)	3/8"	90

2) Mix Strength: Minimum 5.000-psi compressive strength in 28 days
3) Submit design mix and certify material for weight, water content and mixing time.

4) Portland Cement and Water: As specified hereinafter.

c. Portland Cement: ASTM C 150, Type I or II
d. Water: Potable.
e. Forms: Exterior plywood, APA-B8 Plyform Class 1, mill-oiled.
f. Form Oil: Lacquer or resin type compatible with mill-oil.
g. Reinforcing Steel: ASTM A 615 grade 40.
h. Gauging Wires: Piano wire, 0.027 thick.

PART 3 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. Elevations and depths indicated on the plans shall he used in computing the quantities of excavation or fill required of the Contractor and is based on hand placed concrete for the pool shell. Remove all surplus materials from the site or dispose of as directed by the General Contractor. All excavations shall be adequately braced and shored, and shall be kept dry. Use clean, sharp sand or good clay earth for backfill.

B. Provide dewatering of the pool excavation. Dewatering shall consist of removal of groundwater and rain water.

C. Backfill around pool and in piping trenches and compaction of same shall he as called for in the Earthwork Section. Backfilling around piping shall be clean sand.

3.02 CONCRETE PLACEMENT

A. Concrete placement and operations shall be in accordance with Section 03300, “Cast-In-Place Concrete”. The floor slabs of the pool shall be Gunite of the thickness and strength as required. In no case shall the slab be less than 6” thick not less than 3,000-psi in 28 days. The finish shall be such as necessary to accept the plaster finish with maximum adhesion.

B. Gunite: Provide necessary application, 3,000-psi compressive strength, dimensions, removal of rebound, cleanup and protection of surrounding surfaces and areas. All tests required to determine the strength of the Gunite shall be at the Contractor's expense.

3.03 INTERIOR FINISH

A. Plaster contractor shall approve the pool substrate in writing prior to commencing with the plastering work.

B. The pool area shall be enclosed and temperature tempered to 70°F prior to application or any plaster coats. No plaster coats shall be applied during rain, or high wind and any such material that has been newly placed shall be protected by canvas or other covering until the surface has set.

C. Clean interior surfaces of the pool of dust, oil, paint and other material before application of finish coats.

D. Apply 1/4 inch to 3/8 inch finish coat, consisting of white cement and ColorquartzTM aggregate. Float to a uniform plane and trowel to a smooth, dense, impervious surface. There shall be no trowel “burn” marks in the finished surface. Do not stain the finish coat. In the event the application of the final plaster coat must, of necessity, be delayed to a future date, the pool shall be tilled with water and shall be kept filled until conditions permit the application of the finish coat.

E. After the finish coat has dried sufficiently, the pool shall be gradually filled with water, flowing continuously to eliminate dirt rings. During extremely hot weather, the pool walls shall be kept continuously wet while the pool is filling.

3.04 INSTALLATION OF DECK EQUIPMENT

A. The pool contractor shall install all deck equipment. Where the anchoring or setting of mounting equipment is integral with another contractors work, the pool contractor shall be responsible for furnishing the anchors, mounts, etc., in a timely manner (not to interfere with the other contractors schedule) as well as detailed instructions with any necessary dimensions, cutouts, etc. It shall then be the responsibility of the other contractor to install these items in accordance with the instructions.

B. Handicapped Lift: Install in accordance with manufacturers printed instructions. Install in fully grouted stainless steel socket recessed into deck with poly-olefin sleeve and tamper-resistant lid. Installation shall he plumb, level and square and totally rigid.

3.05 ELECTRICAL

A. The pool contractor shall furnish and install (but not connect) all necessary pumps, chemical feeders, control equipment, etc., for complete operation of the pool.

B. General Contractor shall coordinate with all subcontractors/vendors as to who will provide all pool grounding, connecting of all equipment, lighting, pool light conduits, junction boxes, wall outlets, etc for a completed installation of the items required for the pool and spa (where the spa occurs).

3.06 PLUMBING

A. City Water Plumbing: The pool contractor shall not he responsible or any city water plumbing. All pool fill lines with necessary valves, boxes, etc., shall he provided by General Contractor.

B. Pool Waste Water Discharge: It shall be the responsibility of the pool contractor to connect to the water line (provided by General Contractor) in the equipment room and provide and install those items, if any, required by the Health Department for disposal of swimming pool water to waste (e.g., separation tanks, sight glass. etc.).

C. Pool Plumbing: The pool contractor shall he responsible for all pool plumbing associated with the pool recirculation and treatment equipment.

3.07 POOL FILTRATION AND RECIRCULATION EQUIPMENT

A. Install all filtration equipment necessary for proper pool operation, including all valves.

3.08 CLEANUP

A. Upon completion of the poo1 construction, remove from the site all excess materials and debris. Leave the pool and equipment room ready for final inspection.

3.09 INITIAL WATER TREATMENT AND TEST KIT

A. The Contractor shall obtain samples of the water used to fill the pool, and is responsible for instructing the Owner as to any necessary treatment which may be required prior to introduction of the water into the pool. During the filling operation and upon starting the recirculation system, the pool contractor shall furnish adequate quantity of sodium hypoclorite and muriatic acid to establish a free chlorine residual of 2.0 ppm, minimum and a pH of 7.2 to 7.6. After filling, the pool contractor shall balance the water to optimum conditions which shall protect the pool finish and equipment from etching or plating tendencies of the water. The pool contractor shall furnish a test kit as called for herein.

3.10 INSTRUCTION ON POOL EQUIPMENT OPERATION AND MAINTENANCE

A. A qualified representative of the pool contractor shall visit the site of the work after installation has been completed and shall put all equipment into operation, and shall assist and instruct the Owner-Operator in the operation of all such equipment, for a minimum of 5 days or as long as necessary.

B. Provide operating and maintenance manuals as called for in Section 01700, “Contract Closeout”.

3.11 INSPECTION

A. Work considered by the Architect to be of unsatisfactory quality or appearance or not conforming with intent of the plans and specifications shall be corrected by the Contractor at his expense.

END OF SECTION

SECTION 14201

PASSENGER ELEVATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Complete elevator systems.

B. Excavating and backfilling for hydraulic cylinder casing.

1.02 RELATED SECTIONS

A. Section 01500 - Temporary Facilities and Controls: Temporary power supply.

B. Section 02315 - Excavation: Excavation for cylinder casing and hydraulic lines between cylinder and remote machine room.

C. Section 02316 - Fill and Backfill: Backfilling at cylinder casing and hydraulic lines between cylinder and remote machine room.

D. Section 03300 - Cast-in-Place Concrete: Elevator machine foundation.

E. Section 04810 - Unit Masonry Assemblies: Masonry hoistway enclosure; building-in and grouting hoistway door frames.

F. Section 05120 - Structural Steel: Hoistway framing.

G. Section 05500 - Metal Fabrications: Pit ladder and Sill supports.

H. Section 07130 - Sheet Waterproofing: Waterproofing of elevator pit walls and floor.

I. Section 07815 - Sprayed-On Fireproofing: Fireproofing of guide rail brackets where attached to building structural members.

J. Section 09260 - Gypsum Board Assemblies: Gypsum shaft walls.

K. Section 13851 - Fire Alarm System:
   1. Fire and smoke detectors and interconnecting devices.
   2. Fire alarm signal lines to elevator controller cabinet.

L. Section 13925 - Fire Suppression Sprinklers: Sprinkler heads in hoistway.

M. Section 15430 - Plumbing Equipment: Pit sump and pump.

N. Section 16131 - Conduit:
   1. Empty conduit to elevator equipment devices remote from elevator machine room or hoistway.
   2. Empty conduit between controller cabinet in machine room to remote group supervisory panel in lobby.

O. Section 16155 - Equipment Wiring:
   1. Electrical characteristics and wiring connections.
   2. Electrical service to main disconnect in elevator machine room.
   3. Emergency power transfer cabinet.
   4. Electrical power for elevator installation and testing.
   5. Electrical disconnecting device to elevator equipment prior to activation of sprinkler system.
   6. Electrical service for machine room, machine room convenience outlets, and pit.
   7. Lighting in elevator pit.
   8. Empty conduit for telephone service to machine room.

1.03 REFERENCES

A. AISC 360 - Specification for Structural Steel Buildings; American Institute of Steel Construction, Inc.; 2005.

B. ASME A17.1 - Safety Code for Elevators and Escalators; The American Society of Mechanical Engineers; 2004.

C. ASME A17.2 - Guide for Inspection of Elevators, Escalators, and Moving Walks; The American Society of Mechanical Engineers; 2004.

D. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2006.

E. NFPA 70 - National Electrical Code; National fire Protection Association; 2005.

F. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 2007.

G. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

H. UL (ECMD) - Electrical Construction Materials Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate the following information:
   1. Locations of machine room equipment: driving machines, controllers, governors and other component.
   2. Hoistway components: Car, counterweight, sheaves, machine and sheave beams, guide rails, buffers, ropes, and other components.
   3. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
   4. Individual weight of principal components; load reaction at points of support.
   5. Loads on hoisting beams and location of trolley beams.
   6. Clearances and over-travel of car and counterweight.
   7. Locations in hoistway and machine room of traveling cables and connections for car light and telephone.
   8. Location and sizes of access doors, doors, and frames.
   9. Expected heat dissipation of elevator equipment in machine room.
   10. Applicable seismic design data; certified by a licensed Professional Structural Engineer.
   11. Interface with building security system.
   12. Electrical characteristics and connection requirements.
   13. Show arrangement of equipment in machine room so rotating elements, sheaves, and other equipment can be removed for repairs or replaced without disturbing other components. Arrange equipment for clear passage through access door.

C. Product Data: Provide data on the following items:
   1. Signal and operating fixtures, operating panels, indicators.
   2. Cab design, dimensions, layout, and components.
   3. Cab and hoistway door and frame details.
   4. Electrical characteristics and connection requirements.

D. Samples: Submit two samples, 12 x 12 inch in size illustrating cab interior finishes.

E. Maintenance Data: Include:
   1. Parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
   2. Technical information for servicing operating equipment.
   3. Legible schematic of hydraulic piping and wiring diagrams of installed electrical equipment and changes made in the Work. List symbols corresponding to identity or markings on machine room and hoistway apparatus.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with applicable code and as supplemented in this section.

B. Design guide rails, brackets, anchors, and machine anchors under direct supervision of a Professional Structural Engineer experienced in design of work of this type and licensed in the State in which the Project is located.

C. Perform structural steel design, fabrication, and installation in accordance with AISC 360, Specification for Structural Steel Buildings. Perform seismic design in accordance with applicable code.

D. Perform welding of steel in accordance with AWS D1.1.

E. Fabricate and install door and frame assemblies in accordance with NFPA 80.

F. Perform electrical work in accordance with NFPA 70.

G. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.

H. Installer Qualifications: Company specializing in performing the work of this section and approved by elevator equipment manufacturer.

I. Products Requiring Fire Resistance Rating: Listed and classified by UL.

J. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 PRE-INSTALLATION MEETING

A. Review schedule of installation, installation procedures and conditions, and coordination with related work.

B. Review use of elevator for construction purposes, hours of use, scheduling of its use, cleanliness of cab, employment of operator, maintenance of system.

1.07 PROJECT CONDITIONS

A. Construction Use of Elevator: Enclose elevator when required for transport of construction personnel and materials.
   1. Enclose cab with protective plywood on floor, walls, and ceiling.
   2. Provide temporary lighting.
   3. Provide control panel with manual and emergency operation with key operation for attendant operator.

1.08 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Provide one year manufacturer warranty for elevator operating equipment and devices.

1.09 MAINTENANCE SERVICE

A. Provide service and maintenance of elevator system and components for one year from Date of Substantial Completion.

B. Examine system components monthly. Clean, adjust, and lubricate equipment.

C. Include systematic examination, adjustment, and lubrication of elevator equipment. Maintain hydraulic fluid levels. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original equipment. Replace wire ropes when necessary to maintain the required factor of safety.

D. Perform work without removing cars during peak traffic periods.

E. Provide emergency call back service at all hours for this maintenance period.

F. Perform maintenance work using competent and qualified personnel under the supervision and in the direct employ of the elevator manufacturer or original installer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. ThyssenKrupp Elevator; Product Marquis and Seville.

B. Other Acceptable Manufacturers:
   1. Otis Elevator Co: www.otis.com.
   2. Schindler Elevator Corp: www.us.schindler.com.
   3. Substitutions: See Section 01600 - Product Requirements.

C. All components to be manufactured by same entity, unless otherwise indicated.

2.02 ELEVATORS

A. Elevator # 1, 2 & # 3: Passenger, holeless hydraulic type with cylinder in hoistway.
   1. ThyssenKrupp Elevator System Oildraulic.
   2. Operation and Controls: Duplex.
   3. Cab Height: 96 inches.
   4. Hoistway and Cab Entrance Frame Opening Size: 42 x 84 inches.
   5. Door Type: Single leaf.
   6. Door Operation: Side opening.
   7. Rated Net Capacity for Elevator # 1 & 2: 2,500 lbs.
   8. Rated Net Capacity for Elevator #3:
      a. 3,500 lbs for buildings over 3-stories.
   9. Rated Speed: 150 ft/min.
   10. Nominal Platform Size for Elevator # 2 & # 3: 6'-8" x 4'-3" inches.
   11. Nominal Platform Size for Elevator # 1: 6'-8" x 5'-5" inches .
   12. Travel Distance: As indicated on drawings.
   13. Number of Stops: As indicated on drawings.
   14. Number of Openings for Elevator # 2 & # 3: 1 Front.
   15. Number of Openings for Elevator # 1: 1 Front.
   16. Hydraulic Motor and Pump Location: Adjacent to hoistway.

B. Elevator Cabs: See Section 14271.

C. Elevator Hoistway Entrances: See Section 14271.

2.03 CONTROLS

A. Elevator Controls: Provide landing buttons and hall lanterns.

B. Door Controls:
   1. Program door control to open doors automatically when car arrives at floor.
   2. Render "Door Close" button inoperative when car is standing at dispatching terminal with doors open.
   3. If doors are prevented from closing for approximately ten seconds because of an obstruction, automatically disconnect door reopening devices, close doors more slowly until obstruction is cleared. Sound buzzer.
   4. Door Safety Devices: Moveable, retractable safety edges, quiet in operation; equip with photo-electric light rays.

C. Landing Buttons: Stainless steel type, one for originating UP and one for originating DOWN calls, one button only at terminating landings; marked with arrows.

D. Landing Position Indicators: Illuminating white.

E. Car Direction Indicators: Illuminating white.

F. Interconnect elevator control system with building fire alarm systems.

G. Provide "Firefighter's Operation" in accordance with applicable code. Designated Landing: First Floor.

H. Top Floor will be card key access provide card reader in cab.

2.04 EMERGENCY POWER

A. Arrange elevator operation to operate under emergency power when normal power supply fails.

B. Emergency Power Supply: Self-contained battery power.

C. Provide operational control circuitry for adapting the change from normal to emergency power.

D. Upon transfer to emergency power, advance elevator to First Floor, open doors, disable operating circuite, and hold in standby condition.

E. Provide manual switch to override the automatic selection procedure.

2.05 MACHINE ROOM FITTINGS

A. Wall-Mounted Frames: Glazed with clear plastic; sized as required. Provide one for master electric and hydraulic schematic and one for lubrication chart. Install charts.

B. Key Cabinet: Wall-mounted, lockable, keyed to building keying system, for control/operating panel keys.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that hoistway, pit, and machine room are ready for work of this section.

C. Verify hoistway shaft and openings are of correct size and within tolerance.

D. Verify location and size of machine foundation and position of machine foundation bolts.

E. Verify that electrical power is available and of the correct characteristics.

3.02 PREPARATION

A. Arrange for temporary electrical power for installation work and testing of elevator components.

B. Excavate for hydraulic cylinder casing and hydraulic lines between plunger and remote machine room in accordance with Section 02315.

3.03 INSTALLATION

A. Install system components. Connect equipment to building utilities.

B. Provide conduit, boxes, wiring, and accessories.

C. Install hydraulic piping between cylinder and pump unit.

D. Mount motors and pumps on vibration and acoustic isolators, on bed plate and concrete pad. Place on structural supports and bearing plates. Securely fasten to building supports. Prevent lateral displacement.

E. Accommodate equipment in space indicated.

F. Install guide rails using threaded bolts with metal shims and lock washers under nuts. Compensate for expansion and contraction movement of guide rails.

G. Accurately machine and align guide rails. Form smooth joints with machined splice plates.

H. Bolt or weld brackets directly to structural steel hoistway framing.

I. Field Welds: Chip and clean away oxidation and residue, wire brush; spot prime with two coats.

J. Coordinate installation of hoistway wall construction.

K. Install hoistway door sills, frames, and headers in hoistway walls. Grout sills in place. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.

L. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.

M. Machine Room Components: Clean and degrease; prime one coat, finish with one coat of enamel.

N. Adjust equipment for smooth and quiet operation.

3.04 ERECTION TOLERANCES

A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1.

B. Cab Movement on Aligned Guide Rails: Smooth movement, with no objectionable lateral or oscillating movement or vibration.

3.05 FIELD QUALITY CONTROL

A. Testing and inspection by regulatory agencies will be performed at their discretion.
   1. Schedule tests with agencies and notify Owner and Architect.
   2. Obtain permits required to perform tests.
   3. Document regulatory agency tests and inspections in accordance with the requirements of Section 01400.
   4. Perform tests required by regulatory agencies.
   5. Furnish test and approval certificates issued by authorities having jurisdiction.

B. Perform testing and inspection in accordance with requirements of Section 01400.
   1. Perform tests as required by ASME A17.2.
   2. Provide two weeks written notice of date and time of tests.
   3. Supply instruments and execute specific tests.

3.06 ADJUSTING

A. Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.

B. Adjust automatic floor leveling feature at each floor to achieve 1/4 inch from flush.

3.07 CLEANING and PROTECTION

A. Remove protective coverings from finished surfaces.

B. Clean surfaces and components ready for inspection.

C. Do not permit construction traffic within cab after cleaning.

END OF SECTION

SECTION 14271

CUSTOM ELEVATOR CABS AND HOISTWAY DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Passenger cabs with doors and frames.

B. Hoistway doors and frames.

C. The requirements of Section 14201 apply to this Section.

1.02 RELATED SECTIONS

A. Section 14201 - Passenger Elevators: Door control requirements.

1.03 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; 2006a.

B. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.

C. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.

D. PS 1 - Construction and Industrial Plywood; 2007.

1.04 SUBMITTALS - SEE SECTION 14201

1.05 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the type of products specified in this section, with minimum ten years of documented experience.

1.06 JOB CONDITIONS

A. This project has Interior Design Drawings. The Contractor is to verify with the Interior Design Drawings prior to applying any of the following items contained in Part 2 of the following Specification to the Elevators. Interior items addressed within this Specification that are not addressed in the Interior Design Documents shall be applicable to this Specification over the Interior Design Drawings.

PART 2 PRODUCTS

2.01 ELEVATOR CABS

A. Passenger Cabs:
   1. Cab Dimensions: See Section 14201.
   2. Door Type, Size, and Operation: See Section 14201.
   3. Front and Rear Openings: See Section 14201.
   4. Doors: Stainless steel Elevators #1 & #2, Baked enamel on steel Elevator #3.
   5. Door Frames: Same finish as Doors.
   6. Floor Finish: as scheduled.
   7. Wall Finish: Plastic laminate on plywood.
   8. Ceiling: Elevators #1 & #2; suspended stainless steel grid & panels, Elevator #3 Translucent plastic panel in metal grid..
   9. Base: Resilient base.
   10. Front Return Panel: Same as construction as doors.

11. Car Operating Panel: Integral with front return; one per car.
12. Light Fixtures: 6 downlights in Elevators #1 & #2, Fluorescent above translucent panels in Elevator #3..
13. Hand Rail: Stainless steel, at three sides.
14. Door Threshold: Extruded aluminum.
15. Certificate frame.

2.02 HOISTWAY ENTRANCES

A. Hoistway Entrances:
   1. Frames: Stainless steel Elevators #1 & #2, Baked enamel on steel Elevator #3.
   2. Doors: Same as frames.
   3. Fire Rating: 1-1/2 hour fire rating.
   4. Sills: Extruded aluminum.

2.03 CAR FIXTURES

A. Car Operating Panel: Flush-mounted applied face plate, with illuminated call buttons corresponding to floors served, alarm button, and DOOR OPEN/DOOR CLOSE buttons.
   1. Position alarm button where it is unlikely to be accidentally actuated; not more than 54 inches above cab floor.
   2. Provide matching service cabinet integral with front return panel, with hinged door and lock in each car.
   3. Provide the following in each service cabinet:
      a. Switch for each auxiliary operational control, keyed.
      b. Switches for inspection.
      c. Emergency light.
      d. Telephone cabinet and telephone.
      e. Control for each other special feature specified.
      f. 110 V, 15 A convenience receptacle.
   4. Keyed switches for each operational control specified, inspection control, fan, and light.

B. Position Indicator Panel: Above door with illuminating position indicators.

C. Stainless Steel Hand Rail: Flat bar stock, standard 2 inch, No.4 finish.

D. Rails: Spaced 1 1/2 inches from wall.

E. Certificate Frame and Glazing: Stainless steel frame, clear tempered glass glazing, attached with tamper proof screws.

F. Ventilation: Single speed fan; grille in ceiling.

2.04 FINISH MATERIALS

A. Plastic Laminate: NEMA LD 3, HGF; color as selected.

B. Resilient Base: Rubber cove, as specified in Section 09650.

C. Stainless Steel Sheet: ASTM A 666 Type 304; No. 4 finish unless otherwise indicated.

2.05 FABRICATION

A. Components Fabricated of Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A 653/A 653M, with G90/Z275 coating.

B. Cab Door Construction: 0.058 inch thick metal, of hollow sandwich panel construction, flush design, rolled profiles, rigid construction.

C. Cab Door Frames: 0.058 inch thick metal, welded corner design with smooth invisible joints.

D. Thresholds: Configure to align with frame return to allow reversing of cab carpet floor finish.

E. Hoistway Doors: 0.058 inch thick metal, of hollow sandwich panel construction, flush design, rolled profiles, rigid construction.

F. Hoistway Door Frames: 0.058 inch thick metal, of rolled profiles, welded corner with smooth invisible joints.

G. Weatherstripping: Weatherstrip hoistway doors and frames to eliminate audible noise caused by air movement, imposed by car movement in the hoistway, and air pressure differential between hoistway and landing floors.

2.06 FINISHING

A. Baked Enamel on Steel: Clean and degrease metal surface; apply one coat of primer sprayed and baked; two coats of enamel sprayed and baked.

PART 3 EXECUTION

3.01 INSTALLATION - SEE SECTION 14201

END OF SECTION

SECTION 14281

ELEVATOR EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Elevator machines, controllers, hoistway equipment, and accessories.

B. The requirements of Section 14201 apply to this section.

1.02 REFERENCES

A. ASTM A 139/A 139M - Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over); 2004.

B. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2006.

C. NFPA 70 - National Electrical Code; National Fire Protection Association; 2005.

1.03 SUBMITTALS - SEE SECTION 14201

1.04 QUALITY ASSURANCE - SEE SECTION 14201

PART 2 PRODUCTS

2.01 ELEVATOR EQUIPMENT

A. Motors, Hydraulic Equipment, Controllers, Controls, Buttons, Wiring and Devices, and Indicators: Comply with NFPA 70.

B. Guide Rails, Cables, Counterweights, Sheaves, Buffers, Attachment Brackets and Anchors: Purpose designed, sized according to code with safety factors.

C. Buffers: Spring type.

D. Lubrication Equipment:
   1. Provide grease fittings for lubricating bearings requiring periodic lubrication.
   2. Grease Cups: Automatic feed type.
   3. Lubrication Points: Visible and easily accessible.

2.02 HYDRAULIC ELEVATOR EQUIPMENT

A. Cylinder Casing: ASTM A 139, Grade A steel.

2.03 ELECTRICAL COMPONENTS

A. Motors: NEMA MG 1, .

B. Disconnect Switch: Factory mount disconnect switch in control panel.

C. Boxes, Conduit, Wiring, and Devices: As required by NFPA 70.

D. Fittings: Steel compression type for electrical metallic tubing. Fittings with set screws are acceptable only when a separate grounding conductor is also installed across the joint.

E. Spare Conductors: Include 10 percent extra conductors and two pairs of shielded audio cables in traveling cables. Do not parallel conductors to increase electric current capacity unless individually fused.

F. Do not use armored flexible metal conduit as a grounding conductor.

G. Include wiring and connections to elevator devices remote from hoistway and between elevator machine rooms. Provide additional components and wiring to suit machine room layout.

2.04 CAR FABRICATION

A. Frame: Rigid and braced, rolled or formed steel sections, mounted on resilient isolators.

B. Platform: Steel frame, with fire retardant treated plywood subflooring assembly, ready to receive floor finish.

2.05 MISCELLANEOUS ELEVATOR COMPONENTS

A. SUBMERSIBLE SUMP PUMPS
   1. Manufacturers:
      a. Stancor Model SE-50 Oil Minder Elevator Pumps
   2. Type: Completely submersible, vertical, centrifugal.
   3. Motor Housing: Stainless Steel.
   4. Casing: Cast iron pump body and oil filled motor chamber.
   5. Impeller: Cast iron; open non-clog, stainless steel shaft.
   6. Bearings: Ball bearings.
   7. Sump: Concrete pit sized to accommodate pump's operation.
   8. Accessories: Oil resistant 6 foot (2 m) cord and plug with three-prong connector for connection to electric wiring system including grounding connector.
   9. Servicing: Slide-away coupling consisting of discharge elbow secure to sump floor, movable bracket, guide pipe system, lifting chain and chain hooks.
   10. Controls: Integral diaphragm type level controls with separate liquid level control high level alarm.
   11. Performance: a submersible pump and control package which allows water to be automatically pumped from elevator pits in accordance with ASME A17.1 without danger of ejecting potentially harmful oily substances into sewers, rivers and waterways - see drawings.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL - SEE SECTION 14201

3.02 INSTALLATION - HYDRAULIC CYLINDER

A. Excavate for cylinder casing and hydraulic lines between cylinder and remote machine room in accordance with Section 02315. Remove subsoil from site.

B. Maintain shaft alignment of 1 inch from plumb. Fill over-excavated shaft depth with lean concrete.

C. Maintain shaft excavation free of water.

D. Place plunger casing full depth of shaft. Align to 1/4 inch from plumb. Cut top of casing at hoistway pit slab elevation.

E. Backfill around cylinder casing and hydraulic lines between cylinder remote machine room in accordance with Section 02316.

F. Backfill with general fill; placed in 24 inch lifts compacted to 97 percent of dry density.

END OF SECTION

SECTION 14560

CHUTES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gravity chutes for soiled linen.

B. Alternatives: See Section 01230.

1.02 RELATED SECTIONS

A. Section 07530 - Elastomeric Membrane Roofing: Cants and roofing flashing at chute roof vent.

B. Section 13925 - Fire Suppression Sprinklers: Connection to sprinklers inside chute.

C. Section 15145 - Plumbing Piping:
   1. Connection of hopper discharge drain to sanitary drain.

1.03 REFERENCES

A. ASTM A 463/A 463M - Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process; 2006.

B. NFPA 13 - Standard for the Installation of Sprinkler Systems; National Fire Protection Association; 2007.

C. NFPA 82 - Standard on Incinerators and Waste and Linen Handling Systems and Equipment; National Fire Protection Association; 2004.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements for additional requirements.

B. Product Data: Manufacturer's printed data sheets on each component, indicating which options are provided.

C. Shop Drawings: Detailed layout of chute and components, indicating interface with structure, enclosing walls, and utilities; show:
   1. Openings in floors and required clearances.
   2. Location and size of each field connection to structure.
   3. Electrical wiring sizes, conduits, and location of connections.
   4. Clearly indicate components required but not furnished by chute installer.

D. Reports: Submit for each test/inspection; see Section 01400 for requirements.

E. Certificates: Certify that chute assembly meets or exceeds NFPA 82 and specified requirements.

F. Operation and Maintenance Data: Manufacturer's operation instructions.
   1. Include control wiring diagrams.

1.05 QUALITY ASSURANCE

A. See Section 01400 for additional requirements.

B. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

C. Manufacturer Qualifications: Company specializing in making products specified in this section.
   1. With not less than three years of experience.

D. Installer Qualifications: Company specializing in performing the work of this section:
   1. With minimum 2 years of experience.
   2. Approved by manufacturer.

1.06 WARRANTY AND MAINTENANCE SERVICE

A. See Section 01780 for additional requirements.

B. Contractor Warranty: Correct defective work within a five year period after Date of Substantial Completion.

C. Maintenance Service: Provide service and maintenance of chute and equipment for one year from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Chutes and Chute Components: Use one of the following:
   1. Wilkinson-Hi-Rise LLC; : www.whrise.com.
   2. U. S. Chutes Corp; : www.uschutes.com.
   3. Valiant Products, Inc; : www.linenchutes.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. All components need not be made by the same manufacturer, provided manufacturer providing assembled units assumes responsibility for all components.

2.02 CHUTES

A. Linen Chutes: Sheet metal, round, constant diameter extending from above roof to lowest floor with intake doors at each floor and bottom outlet into room designated on drawings; complying with requirements of NFPA 82 and local code.
   1. Diameter: 24 inches inside.
   2. Intake Doors: Side-hinged, key-locked.
   3. Intake Door Size: 21 by 21 inches wide by high.
   4. Interlock system and sensors that automatically prevents:
      a. Opening more than one intake door at a time.
      b. Opening any intake door when temperature in chute exceeds predetermined, adjustable temperature.
      c. Opening any intake door when linen collection equipment is unable to accept linen.

2.03 COMPONENTS

A. Chute: Factory-fabricated to the greatest extent possible, with continuously welded or lock-seamed joints and smooth, non-snag interior (no protruding bolts, rivets, hardware, sharp edges or corners).
   1. Material: Aluminum-coated steel sheet complying with ASTM A 463/A 463M CS Type B, with minimum T1-40/T1M-120 coating.
   2. Sheet Metal Thickness: 16 gage, 0.06 inch.
   3. Throat Sections: Provide sloped throat sections for intake doors, of same material and construction as chute.
   4. Fabricate with support frames at each floor with sound isolator pads and expansion joints in chute between each support point.
   5. Horizontal Outlets: Provide painted steel leg braces to floor to withstand impact of material on bottom of chute.

B. Intake Doors: Factory-assembled door and frame, self-closing and positive-latching; frame designed for chase construction, flush-mounted.
   1. Material: Stainless steel, brushed or satin finish.
   2. Fire Rating: 1-1/2 hour ("B" label) with 30-minute temperature rise of 250 degrees F .
   3. Side-Hinged Doors: Right-hand swing unless otherwise indicated; 180 degree swing.
   4. Pulls: T-handle latch; polished stainless steel.
   5. Signs: Mark on frame or door face the purpose of the chute, using engraving, integral raised lettering, or other permanent signs to read "SOILED LINEN".

C. Discharge Doors: Aluminum-coated steel; normally-open, 1-hour ("B" label) fire rated, with fusible link closing; style as required by chute configuration.
   1. Horizontal Discharge Style: Top-hinged, drop-down, self-latching, in horizontal housing with 2 inch NPS piped drain connection in bottom.

D. Access Doors: Same construction and fire rating as intake doors, with locks; provide wherever equipment requiring maintenance is located inside chute, including sprinklers and plumbing and electrical connections.

E. Intake and Access Door Locks: Mortise or rim cylinder locks keyed alike; key removable only when door is locked.
   1. Intake Doors: Provide 4 keys for each door.
   2. Access Doors: Provide 2 keys for each door.

F. Roof Vent: Full diameter, extending minimum 48 inches above roof level, with roof deck flange.
   1. Material: Manufacturer's standard.
   2. Counterflashing and clamping ring of non-ferrous metal compatible with chute material.
   3. Top Unit: Screened vent.

G. Fire Sprinklers: Comply with NFPA 82 and NFPA 13; provide 1/2 inch NPS sprinkler heads mounted inside chute intake throats at the following locations:
   1. At or above the top intake opening.
   2. At the lowest intake opening.
   3. In buildings of more than two stories, at every other floor.

H. Electrical Controls: 110 V AC.

2.04 MAINTENANCE PRODUCTS

A. See Section 01600 for additional requirements.

PART 3 EXECUTION

3.01 COORDINATION

A. Complete chute installation and testing before completion of enclosing construction.

B. Coordinate sprinkler and spray cleaning devices with with size, location and installation of service utilities.

C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

3.02 INSTALLATION

A. Install chutes and equipment in accordance with NFPA 82 requirements and manufacturer's instructions.

B. Maintain fire-resistive capacity of enclosing walls.

C. Install chute plumb and without offsets or obstructions that might prevent free fall of materials, except where indicated on drawings.

D. Anchor securely in manner required to withstand impact and weight of materials in chute.

E. Install roof vent flange to roof deck prior to installation of roofing.

F. Install counterflashing after roofing installation.

G. Adjust doors and other operating components for smooth operation.

3.03 FIELD QUALITY CONTROL

A. See Section 01400 for additional requirements.

B. Place bagged material of expected size in chute to verify free fall.

C. Test all components for proper operation.
   1. Operate doors, locks, and interlocks.
   2. Operate spray cleaning devices.
   3. Simulate fire conditions inside chute to verify sprinkler and detector operation.

3.04 CLEANING

A. After completion of enclosing walls, clean exposed chute components; do not remove testing agency labels.

END OF SECTION

Section 15000

HEATING, VENTILATING, AIR CONDITIONING AND PLUMBING SYSTEMS

Holiday Inn

Bossier City, Louisiana
September 2, 2007
Architect: **LLW Architects**
Engineer: **Crabtree Engineering**

Part 1 – GENERAL

1.1 DESCRIPTION

A. The work under this section shall confirm to the requirements of "Division 1, General Requirements," "Conditions of the Contract" and "Supplementary Conditions." Specific attention is called to the "Mechanical General Requirements" located in Section 15001.

B. It is the intent of these specifications to provide a heating, ventilating and air conditioning system and plumbing system complete, fully adjusted, and ready for use.

1.2 REQUIRED WORK IN OTHER SECTIONS

H.V.A.C. and Plumbing Systems	15000
Mechanical and Electrical General Equipments	15001
Identification of Equipment and System	15047
Piping	15060
Pipe Hangers and Supports	15090
Valves	15100
Pumps	15140
Vibration and Noise Isolation	15200
Insulation	15250
Plumbing	15400
Drains and Hydrants	15422
Cleanouts	15423
Gas Fired Domestic Water Heater	15425
Plumbing Fixtures and Trim	15450
Make-Up Air Units	15665
Pool Dehumidification Unit	15720
Power Roof Ventilators	15830
Ductwork System	15840
Testing, Adjusting and Balancing of HVAC System	15896

Part 2 - PRODUCTS

2.1 EQUIPMENT

A. General: All equipment shall be the capacity and types specified and as shown on the Equipment Schedule in the Drawings, and shall be the listed manufacturer and model number or shall be an equal approved in advance.

B. Single Source: For ease of maintenance and parts replacement, to the maximum extent possible, use equipment of a single manufacturer.

C. All Equipment indicated as “Owner Furnished Contractor Installed” (OFCI), will be purchased by the Owner. The contractor shall be responsible for scheduling delivery, unloading, storing, staging and installation. Installation shall include all ductwork, air distribution (including louvers), refrigerant piping, condensate drains, and electrical connections. Equipment to be provided by the owner shall include, Split Systems, VTAC Units, and Rooftop Units.

2.2 MATERIAL

All material required for a complete and proper installation shall be as specified and as selected by the Contractor subject to approval.

Part 3 – EXECUTION

3.1 CONDITIONS

A. Verify that the work of this Section may be completed in strict accordance with all pertinent codes and regulations, and the manufacturers’ recommendations.

3.2 INSTALLATION OF EQUIPMENT

A. Locations: Install all equipment in the locations shown, except where specifically otherwise approved on the job.

B. Interferences: Avoid interference with structure, and with work of other trades, preserving adequate headroom and clearing all doors and passageways.

C. Inspection: Check each piece of equipment in the system for defects, verifying that all parts are properly furnished and installed, that all items function properly, and that all adjustments have been made.

3.3 CLOSING-IN OF UNINSPECTED WORK

A. General: Do not allow or cause any of the work of this section to be covered up or enclosed until it has been inspected, tested, and approved.

3.4 COOPERATION WITH OTHER TRADES

Do all things necessary to cooperate with other trades in order that all systems in the work may be installed in the best arrangements.

Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.

3.5 COMPLETENESS

It is the intent of these specifications to provide a complete system. Completeness shall mean not only that all material and equipment has been installed properly, but that all material and equipment has been installed, and has been adjusted for heating and cooling, and that all material and equipment is operating as designed.

Section 15001

MECHANICAL GENERAL REQUIREMENTS

PART I – GENERAL

1.01 DESCRIPTION

A. General:

The work under this section shall conform to the requirements of the "General Conditions" and Supplementary Conditions of these specifications.

B. Work included:

The work included in this section consists of the general requirements for the work more specifically described in Division 15.

C. Definition:

The Contractor shall provide all supervision, labor, material, equipment, and all other items necessary to complete the mechanical systems. All items and equipment are specified in the singular; however, the Contractor shall provide the number of items of equipment as indicated on the drawings, and as required for complete systems.

D. Intent:

It is the intention of these specifications and drawings to call for finished work, tested, and ready for operation. Wherever the word "provide" is used, it shall mean, "furnish and install complete and ready to use."

E. Codes, Rules, Permits and Fee:

The Contractor shall give all necessary notices, obtain all permits and file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required certificates of inspection of his work.

All materials furnished and all work installed shall comply with the National Fire Codes of the National Fire Protection Association, with the requirements of local utility companies, and with the requirements of local code.

All material and equipment for the electrical portion of the mechanical systems shall bear the approval label or shall be listed by the Underwriters' Laboratories, Incorporated.

1.02 QUALITY ASSURANCE

A. Surveys and Measurements:

The Contractor shall base all measurements, both horizontal and vertical, from established benchmarks. All work shall agree with these established lines and levels. Verify all measurements at site and check the correctness of same as related to the work.

Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall not proceed with his work until he has received instructions.

B. Drawings:

Drawings are diagrammatic and indicate the general arrangement of systems and work included in the contract. Drawings are not to be scaled. The architectural drawings and details shall be examined for exact location of fixtures and equipment. Where they are not definitely located, this information shall be obtained from the owner's representative.

The Contractor shall follow drawings in laying out work and check drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate, the owner's representative shall be notified before proceeding with installation.

C. Cooperation with Other Trades:

The subcontractors shall give full cooperation to other trades and shall furnish any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

D. Protection:

The Contractor shall protect all work and material from damage by his work, workmen, subcontractors' work or subcontractors' workmen.

E. Material and Workmanship:

All materials and apparatus required for the work, except as specifically specified otherwise, shall be new, of first class quality, and shall be furnished, delivered, connected and finished in every detail, and shall be so selected and arranged as to fit properly into the building spaces. Where no specific kind or quality of material is given a first-class standard ar5ticle shall be furnished.

The Contractor shall furnish the services of a full-time, experienced superintendent, who shall be constantly in charge of the installation of the work, together with all skilled workmen, fitters, metal workers, welders, helpers, and laborers required to unload, transfer, connect-up, adjust, start, operate, and test each system.

1.03 SUBMITTALS

A. Shop Drawings:

The Contractor shall submit for approval detailed submittals of all equipment and no equipment may be delivered to the job site or installed until the Contractor has in his possession the approved submittal for the particular equipment. The Contractor shall furnish the number of copies required by the General and Special Conditions of the contract, but in no case less than six (6) copies. **All information shall be provided at one time. All information shall be assembled in a (3) ring binder with index sheet and tabbed dividers.** Submittals shall include any owner furnished equipment.

B. Equipment Deviations:

Where such approved deviation requires a different quantity and arrangement of ductwork, piping, and equipment from that specified or indicated on the drawings, the Contractor shall furnish and install any such ductwork, piping, structural supports, insulation, controllers, and any other additional equipment required by the system, at no additional cost to the Owner.

l.04 WARRANTY

A. All equipment supplied for these specifications shall be free from defects in material, workmanship, and shall be of the kind and quality described herein. If it appears within one year from date of shipment by the Seller that the equipment does not meet the warranties specified above, the Seller shall correct. Any defect, including non-conformance with these specifications, at his option, either by repairing any defective part or parts or by making available at his plant a repaired or replacement part.

PART 2 – PRODUCTS – Not Applicable

PART 3 – EXECUTION

3.01 SCAFFOLDING, RIGGING, HOISTING

The Contractor shall furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery in the premises of any equipment and apparatus furnished. Remove from premises when no longer required.

3.02 EXCAVATION AND BACKFILLING

A. Mass excavation to approximate building levels will be carried out under a section of the architectural specifications. The Contractor shall, however, do all trench and pit excavation and backfilling required for work under this section of the specifications, inside and outside the building, including repairing of finished surfaces, all required shoring, bracing, and all protection for safety of persons and property. Local or State Safety Codes shall be strictly observed.

B. Filling, Backfilling, and Compaction: Shall be as specified under the architectural section of these specifications.

3.03 ACCESSIBILITY

A. Contractor shall locate all equipment, which must be serviced, operated, or maintained in fully accessible positions within the space allowed.

3.04 FOUNDATIONS, SUPPORTS, PIERS, ATTACHMENTS

A. All equipment, unless shown otherwise, shall be securely attached to the building structure.

3.05 ELECTRICAL CONNECTIONS

A. The following work shall be considered to be under Division 15.

1. All temperature and control wiring.

3.06 CUTTING AND PATCHING

A. This Contractor shall provide all cutting and patching necessary to install the work
Specified in this section. Patching shall match adjacent surfaces.

B. No structural members shall be cut without the approval of the structural engineer, and all such cutting shall be done in a manner directed by him.

3.07 SLEEVES AND PLATES

A. This Contractor shall provide and locate all sleeves and inserts required before the
Floors and walls are built. The Contractor shall do all drilling required for the installation of his hangers.

B. Sleeves shall be provided for all mechanical piping passing through concrete floor slabs and concrete, masonry, tile and gypsum wall construction. Sleeves shall not be provided for piping running embedded in concrete or insulating concrete slabs on grade.

C. Where sleeves are placed in exterior walls below grade, the space between the pipe or conduit and the sleeves shall be made completely watertight.

D. Where pipe motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe. Where sleeves pass insulated pipes, the sleeves shall be large enough to pass the pipe only and the insulation shall be made to butt against the construction except for pipes requiring insulation having a vapor barrier, in which case, the sleeves shall be large enough to pass the pipe and insulation. Check floor and wall construction finishes to determine proper length of sleeves for various locations; make actual lengths to suit the following:

1. Terminate sleeves flush with walls, partitions, and ceiling.

2. In areas where pipes are concealed, as in chases, terminate sleeves flush with
Floor.

E. All penetration of pipe, ducts, or conduit thru fire rated floors, ceilings, or partitions shall be sealed with 3M fire caulk, or equal flame seal system or Proset System.

F. Escutcheon plates shall be provided for all exposed un-insulated pipes and all exposed conduit passing through walls, floors, and ceilings. Plates shall be nickel plated, of the split ring type, of size to match the pipe or conduit.

3.08 WATERPROOFING

Where any work pierces waterproofing. Contractor shall furnish all necessary sleeves, caulking, and flashing required to insure openings are absolutely watertight.

3.09 GUARDS AND RAILINGS

The Contractor shall provide belt drives and rotating machinery wit readily removable guards or railings. Guards shall consist of heavy angle iron frames, hinged and latched, with heavy galvanized iron wire crimped mesh securely fastened to frames.

3.10 OPERATING INSTRUCTIONS

Upon completion of a work and all tests, Contractor shall furnish the necessary skilled labor and helpers for operating his system and equipment for a period of one (1) day. During this period, instruct the Owner or his representative fully in the operations, adjustment and maintenance of all equipment furnished. The Contractor shall furnish three (3) compete bound sets of instructions for operating and maintaining all systems and equipment included in this contract.

SECTION 15047

IDENTIFICATION OF EQUIPMENT AND SYSTEM

PART 1 – GENERAL

1.01 WORK INCLUDED

Provide the Identification work as specified herein:

All piping systems and equipment on the project shall be identified as specified herein. All marks of identification shall be easily visible from the floor or usual point of vision.

PART 2 – PRODUCTS

2.01 EQUIPMENT

A. Equipment shall be identified to correspond with the schedules on the drawings.

B. Identification shall be with black, lamacoid plastic tags with white appearing letters.

C. Tags shall be 1 ½ " high with ¾ " high letters.

2.02 PIPING

A. All piping systems (sanitary, gas, cold water, hot water, hot water return, and condensate drains) shall be identified, including the direction of flow.

B. All gas pipes shall be painted yellow.

C. Piping identification shall be as manufactured by Seton or approved equal.

D. Direction of flow shall be by "arrows-on-a-roll" as manufactured by Seton or approved equal.

PART 3 – EXECUTION

3.01 PIPING

A. All piping shall be identified as to the service of the pipe and the normal direction of flow.

B. Arrows-on-a-roll shall overlap the label on both ends and shall wrap the full circumference of the pipe.

3.02 EQUIPMENT

All equipment, except in finished rooms, shall be identified by engraved nameplates.

SECTION 15060

PIPING

PART l - WORK INCLUDED

Provide the piping systems as shown on the drawings and as specified herein for the Mechanical Systems.

PART 2 - PRODUCTS

2.01 PIPING

A. All materials and specialties required for the work shall be new, of first-class quality and shall be furnished, delivered, connected and finished in every detail, and shall be so selected and arranged as to fit properly into the building spaces.

1. Cooling Coil Condensate Drip Piping

a. Pipe Material, shall be DWV copper or Schedule 40 PVC.

2. Soil, Waste, Vent and Rain-leader Piping

a. Pipe Material Above Grade

1. Risers: Service weight cast iron with no-hub joints or bell and spigot joints.

2. Piping 2” and Below: No-hub cast iron, Schedule 40 galvanized steel Pipe with screwed ends, or DWV copper with soldered joints.

3. Between Floor Piping 3” and Larger: Service weight cast iron with no-hub joints or DWV copper with soldered joints.

4. PVC piping shall not be used above grade.

b. Pipe Material Below Grade

1. Piping below grade shall be service weight cast iron with gasket joints. Schedule 40 PVC-DWV, solid core, may be used below grade where acceptable to code authorities.

2. No screwed joints below grade.

3. No pipe less than 2” below grade.

3. Gas Piping

Pipe material, shall be schedule 40 black steel pipes with malleable fittings. Where gas pipe connects to equipment, it shall be provided with a drip leg the full size of the run out, a 100% shut-off valve and a union. All gas piping shall be painted yellow.

4. Cold Water Piping Underground (2" and below)

Pipe Material, shall be type "K" soft drawn copper tubing with compression fittings or silver solder joints and wrought copper fittings.

5. Domestic Water Piping Above Ground

Pipe Material, shall be type "L" hard drawn copper tubing with 125 psi solder joint copper or brass fittings.

3.01 PIPE WORKMANSHIP

A. Above Grade Piping

The piping shown on the drawings shall be installed complete and shall be of the size shown on the drawings. All piping shall be installed parallel or perpendicular to the building construction.

B. Below Grade Piping

All pipes shall be installed in such a manner that it does not bear directly on rocks or debris in ground. At any location where pipe passes close to or through walls or footings, it shall be protected from contact with concrete or cinder block. A cast iron sleeve large enough to permit free movement of the pipe shall protect any pipe passing through building walls. Where pipe passes through a building wall from underground to inside building, the sleeve shall be made watertight.

3.02 SCREW JOINTS

All pipes shall be reamed to full pipe diameter before joining. Screwed joints shall be made with standard pipe thread and an approved compound applied to the male thread only.

3.03 SOLDERED PIPING JOINTS

All pipe shall be reamed to full diameter before joining. Ends of pipe and inside of fittings shall be cleaned and flux applied to entire area of pipe end to be soldered. On pipe 1 to 1½ and larger, flux shall be applied to pipe and fittings. Joints shall be made with lead free solder for hot water and cold water.

3.04 NO-HUB JOINTS

The pipe and fittings shall be designed for the No-Hub system of joining cast iron waste pipe. The joint shall consist of a neoprene gasket and a stainless steel or cast iron compression clamp. The pipe shall be inserted the full depth of the gasket and the clamp tightened to the amount of torque-pounds recommended by the joint manufacturer.

3.05 BELL AND SPIGOT JOINTS

The cast iron pipe shall have bell-and-spigot cast iron fittings of the same weight of the pipe. Pipe and fittints shall have hubs specifically cast to receive a neoprene gasket and spigot ends shall be without bead. The neoprene gasket shall be inserted in the hub and the spigot shall be pulled into the gasket with a tool made for this purpose. Lubricant as recommended by the gasket manufacturer shall be used on the spigot to insure proper seating Lead and oakum joints shall be used as required for support of off-sets and special piping conditions.

3.06 WELDED JOINTS

A. General: All steel pipe joints shall be welded when 2 inches and larger, 1 ½ inch steel pipe joints may be welded at Contractor's option.

B. Welded Joints

1. All pipe and welding fittings shall be beveled to an approximate angle of 37 ½ degrees. All beveled surfaces shall be cleaned of slag and unnecessary roughness by grinding or filing.

2. A welding back-up ring shall be used for all butt welds for pipe or fittings. Joints for between steel pipe and between pipe and fittings 2" and larger shall be butt fusion-welded. Joints 1 ½ and smaller shall be socket weld type.

3. Branch line and changes of direction shall be made with factory furnished weld fittings, such as tees, 90 degree ells, 45 degree ells, weld-o-lets, thread-o-lets, socket-o-lets, welding saddles, reducers, flanges, and shaped nipples. Job fabrication will not be permitted. Stab-ins will not be permitted.

4. Misalignment or hi-lo condition of pipe to pipe-to-pipe, pipe-to-fittings, or pipe-to-flange or valve shall be held to a maximum of plus or minus 1/16".

C. Welds: All welds shall consist of the following passes:

1. A stringer bead pass

2. A hot pass

3. A cover or filler pass. A valley in the center or at edge shall not be permitted.

4. All welds shall be of sound metal, thoroughly fused to the base metal at all points, free of cracks, oxidation, blow holes and nonmetallic inclusions.

D. Welding Electrodes: All electrodes shall conform to American Welding Society Standards E-6010, E-7010, E-7018, or E-8018-B2 C1.

E. Bending of pipe may be used in lieu of using weld fittings. The Contractor shall use a hydraulic pipe bender and seamless piping. All bends shall be of 22 ½ degree, 45 degree, 90 degree, or 180 degree bends.

C. All welding work shall be specified by standards in the following codes: ASTM, AWS, API, MIL, ANSI, and ASME.

D. All concealed gas pipe shall be welded.

3.07 PIPING SUPPORT (ABOVE GRADE)

A. All piping shall be supported from the building structure in a neat and workmanlike manner and wherever possible, parallel runs of horizontal piping shall be grouped together on trapeze type hangers. The use of wire or preformed metal to support pipes will not be permitted. Hanging pipes from other pipes will not be permitted. Spacing of pipe supports shall not exceed 10 feet on all piping. Soil and waste piping shall be supported every 5 feet. Piping shall be carefully coordinated before installation with other systems and equipment in chases and congested areas.

B. Vertical and horizontal pipes subject to sway in either direction shall have snubbers to prevent lateral movement. Pipes that have movement due to water hammer shall be restrained with snubber brackets and stand-off brackets.

3.08 PIPING SUPPORT (BELOW GRADE)

A. Earth shall be excavated to a minimal depth with an even surface to insure solid bearing of pipe for its entire length. Where water lines cross-deeper excavations, these shall be filled and tamped to the proper level before copper pipe is installed.

1. Interior: The water pipe shall be installed a minimum of 4 inches below the slab and shall not be in direct contact with the concrete at any point.

2. Exterior: The water pipe shall comply with local codes.

3.09 PIPING TESTS

A. Scope: All piping installed on the project unless specifically shown otherwise shall be hydraulically tested as specified herein. Refrigeration piping, if used on the project, shall be tested as specified under refrigeration piping. This Contractor provide all equipment required to make the tests specified herein.

B. Sectionalizing - Piping may be tested a section at a time in order to facilitate the construction.

C. Test to be Performed - The subcontractor shall fill the section of the pipe to be tested with water and bring the section up to pressure with a test pump. These tests shall be conducted before any insulation is installed and any insulation prior to these tests shall be removed.

D. Duration of Tests - All tests shall apply full test pressure to the piping for a minimum of twenty-four hours.

E. Pressure of Tests - All tests shall be conducted at the water working pressure of the pipe installed. When Schedule 40 or standard weight pipe is used, the test pressure shall be 150 pounds per square inch.

F. Inability to Hold Pressure - When the test pressure has fallen over five percent during the twenty-four hour test period the point of leakage shall be found, repaired, and the test repeated. This procedure shall be followed until the piping system has been proven absolutely tight.

G. Delicate Controls - When delicate control mechanisms are installed in the piping section, they shall be removed during the tests to prevent shock damage. This does not apply to control valves.

H. Leaks - Leaks developing subsequent to these tests shall not be repaired by mastic or other temporary means. All leaks shall be repaired by removal of the valve, fitting, joint, or section that is leaking, and reinstalling new material with joints as specified above.

I. Storm and Sanitary Systems - The entire system shall be hydrostatically tested. The test shall comprise the plugging of all openings in the system, filling the system or portion thereof with water to the roof level or a minimum of 10 feet, until all joints are proven tight.

3.10 STERILIZATION

After final testing for leaks, all new potable lines shall be thoroughly flushed by plumbing contractor to remove foreign material.

SECTION 15090

PIPE HANGERS AND SUPPORTS

PART 1 – GENERAL

WORK INCLUDED

Provide piping and equipment support as specified herein for the Mechanical Systems.

1.02 EQUIVALENTS

The following products are defined by referring to items manufactured by B-Line Systems, Inc. Alternates may be submitted for approval, as manufactured by Fee & Mason, Grinnell, Michigan Hanger, or approved equal.

PART 2 – PRODUCTS

2.01 Provide supports complete, including rods, bolts, turnbuckles, bases, upper attachments, and concrete inserts.

2.02 HANGER RODS ANDS STRAPS

Refer to the following table for recommended sizes and spacing of pipe hangers:

Steel and Cast Iron Pipe

Pipe Diam.	Max Spacing	Rod Size
1/2”	5 FT.	3/8”
3/4”	6 FT.	3/8”
1”	7 FT.	3/8”
1-1/4”	8 FT.	3/8”
1-1/2 “	9 FT.	3/8”
2”	10 FT	3/8”
2-l/2”	11 FT.	1/2"
3”	12 FT.	1/2”
4”	14 FT.	5/8”
5”	16 FT.	5/8”
6”	17 FT.	3/4”
8”	19 FT.	7/8”
10”	22 FT.	7/8”

COPPER PIPE

Pipe Diam.	Max Spacing	Rod Size
1/2”	5 FT.	3/8”
3/4”	6 FT.	3/8”
1”	6 FT.	3/8”
1-1/4”	7 FT.	3/8”
1-1/2”	8 FT.	3/8”
2”	9 FT.	3/8”
2-l/2”	10 FT.	3/8”
3”	10 FT.	3/8”
3-1/2”	11 FT.	1/2”
4”	12 FT.	1/2”

Refer to “Low Pressure Duct Construction Standards” (SMACNA 5th Ed.) for hanger size and spacing for the support of ducts.

PIPE HANGERS

Insulated pipes 2” and above which carry heated water shall be supported by clevis hangers. Hangers shall be constructed of steel and be designed to allow longitudinal movement and vertical adjustment. Hanger shall be sized to accommodate both the pipe and the insulation. Hangers shall be B-Line Figure B3110 or an approved equal.
Insulated pipes 1 ½” and below which carry heated water shall be supported by standard clevis hangers. Hangers shall be constructed of steel and be designed to allow vertical adjustment. Hangers shall be sized to accommodate both the pipe and insulation. Hangers shall be B-Line Figure B3108 or an approved equal.
Insulated pipes, which carry cold water shall be supported by standard clevis hangers. Hangers shall be constructed of steel and be designed to allow vertical adjustment. Hangers shall be sized to accommodate both the pipe and insulation.
Pipes which do not require insulation shall be supported by standard clevis hangers. Hangers shall be constructed of steel and be designed to allow vertical adjustment. Hangers shall be B-Line Figure B3100 or an approved equal.

INSULATION SHIELDS

Where insulated pipes pass through clevis or trapeze hangers, shields shall be provided to protect the insulation. Shields shall be a minimum of 12” long and be constructed of galvanized steel.

TRAPEZE HANGERS

Where pipes are run parallel and at the same elevation the Contractor may elect to use trapeze support.
Trapeze shall consist of strut type channel with slotted holes. Channel size, hanger rod size, and spacing of hanger rods shall be in accordance with the channel manufacturers recommendations.
Pipes shall be secured to the channel with semi-circular straps. Straps shall be sized to accommodate both the pipe and insulation (where applicable). Straps shall be B-Line Figure B2400 or an approved equal.

FLOOR SUPPORT

Pipes that run vertically and pass through a floor shall be supported at the floor line by riser clamps. Steel pipes shall be supported by clamps equal to B-Line Figure B3373. Copper pipes shall be supported by clamps equal to B-Line Figure B3373CT. Where pipes are required to be insulated, insulation shall be continuous around the riser clamps.

Where pipes are run near the floor, support shall be provided by base stands and pipe saddles. Stands shall be securely attached to the floor and be constructed of steel. Stands shall be equal to B-Line Figure B3088T. Saddles shall be constructed of steel and shall allow for vertical adjustment. U-bolts shall be provided to secure the pipe to the saddle. The saddle shall be sized to accommodate both pipe and insulation (where applicable). Saddles shall be B-Line Figure B3092 or an approved equal.

Where pipes are run along the floor they shall be secured in place by steel hold down guides. Hold downs shall be sized to accommodate both pipe and insulation (where applicable). Hold downs shall be B-Line Figure B3252 or an approved equal.

WALL SUPPORT

Where pipes are run along walls, support may be provided by wall brackets and chair supports. Wall brackets shall be constructed of steel. Brackets shall be B-Line Figure B3064 or an approved equal. Chairs which support pipes subject to expansion shall be roller type, constructed of steel, equal to B-Line Figure B3120. Pipes which are not subject to expansion shall be supported on steel chairs equal to B-Line Figure B3147A. All chairs shall be sized to accommodate both pipe and insulation (where applicable). When chairs equal to Figure B3064 are used to support insulated pipe, shields shall be provided to protect the insulation. Shields shall be in accordance with Paragraph 2.04A. When chairs equal to Figure B3147A are used to support insulated pipe, shields shall be provided to protect the insulation. Shields shall be in accordance with Paragraph 2.04B.

UPPER ATACHMENTS AND INSERTS

All upper attachments an inserts for the support of pipe and equipment shall be suited for the structure encountered. Attachments and inserts shall be sized by the manufacturer based on the load to be supported.

2.09 EQUIPMENT SUPPORT

All equipment shall be supported as detailed on the drawings. Where no detail is provided equipment shall be supported as recommended by the manufacturer.

PART 3 – EXECUTION

Chain, wire, strap and other makeshift devices shall not be used as hangers or supports.

3.02 Hangers to support piping shall be fabricated to permit adequate adjustment after erection while still supporting the load. Pipe guides and anchors shall be installed to keep pipes in accurate alignment, to direct the expansion movement and to prevent bucking, swaying, and undue strain.

3.03 Trapeze hangers may be used where pipes are run parallel and at the same elevation.

3.04 Installation of piping, headers and equipment shall be coordinated with requirements of other sections; and, where necessary, specific provisions shall be made for the support of such items. Provide structural and miscellaneous steel not shown on the drawings but required to properly support piping, headers, and equipment.

Provide hangers at each tee and change in direction.

Space hangers and supports to prevent sagging and reduce strain on valves and specialties, with spacing no greater and rod size no smaller than shown on the table in this Section.

SECTION 15100

VALVES

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

1.02 WORK INCLUDED

Provide the valves as shown on the drawings and as specified herein for the mechanical systems.

PART 2 – PRODUCTS

2.01 VALVES

A. All valves required for the work shall be new, of first-class quality, and shall be furnished, delivered, connected and finished in every detail, and shall be so selected and arranged as to fit properly into the building spaces. All valves shall be protected at all times from dirt and moisture. During storage on the ob site or construction, the Contractor shall keep valve ends plugged or capped too prevent dirt or moisture entering the valves.

B. Manufacturer

Insofar as possible, valves shall be the product of one manufacturer: Jenkins, Nibco, Stockham, Kennedy, Milwaukee, Apolo, DeZurik, Centerline, Chapman, Crane, or equal.

C. Valve ends, generally. Valves up through 2 inches shall have sweat ends, valves 2 1/2 inches and 3 inches shall have either sweat or flanged end, valves 4 inches and larger shall have flanged ends. Where screwed ends are used, install a union nearby to facilitate removal and service of the valve. Victaulic valves with grooved connections are acceptable.

D. Pressure Rating: All valves shall have a pressure and temperature rating equal to or greater than the pipe in which they are installed.

2.02 DOMESTIC WATER PIPING SYSTEMS

A. Gate Valves: Valves 2 ½" and larger shall be gate valves and shall be of the wedge disc type, permit straight line flow, complete shut-off. The valve shall have a deep stuffing box for long contact with the stem, packing gland and filled with high quality packing. Valves shall be iron body bronze mounted with ends to suit pipe and shall be of non-rising stem type. Working pressure for bronze valves shall be 150 pounds and iron valves 125 pounds per square inch. Gate valves shall be only be used 2 ½" and larger. Ball valves shall be used for 2" and smaller.

B. Ball Valves: Shall have bronze body with ends to suit pipe and bronze chrome-plated ball. Stem shall be bronze keyed to a steel handle. Valve ends shall be soldered when installed in copper pipe systems. Ball valves shall be full port, three piece. Butterfly valves may not be used.

C. Balancing Valves: All valves on hot water return piping shall be balancing type valves. Balancing valves shall be equal to Bell & Gossett low flow circuit setters.

D. Check Valves: Shall be horizontal swing type with two-piece hinges, disc construction seats to be bronze and discs bronze or with composition face depending on service. Valves 2 inches and smaller shall be bronze to suit pipe ends and have full area Y pattern body and integral seats. Valves 2½ inches and larger shall be iron body brass mounted and with ends to suit pipe. Working pressure for check valves shall be 125 pounds.

E. Backflow Preventer: Shall be equipped with two independent check valves and an intermediate relief valve. The unit shall be provided with test cocks to verify operation of the valve under backflow conditions. Inlet and outlet service valves shall be provided and the backflow prevented shall have A.S.S.E. and A.W.W.A. approval.

F. Temperature Regulating Valves: Shall be self-actuating valve that automatically regulates the incoming domestic hot and cold water to provide a reduced temperature hot water. The valve shall not require an external source of power. The outlet temperature shall be adjustable and monitored by a dial thermometer. The valve shall hold the temperature within three degrees plus or minus of the set point. The valve shall have bronze body a stainless steel trim.

G. Pressure Reducing Valves: Shall be bronze bodies with stainless steel trim for valves 1: and smaller and iron body treated to resist corrosion with stainless steel trim for valves 1¼ inches and larger. Valves shall be field-adjustable for the outlet pressures noted on the drawings.

2.03 GAS PIPING SYSTEM

Valves shall be ¼ inch turn lubricated square-head cocks with the position of the gate indicated on the head.

2.04 GASKETS

All flanged valves shall be installed with gaskets of the type recommended by the manufacturer of the valve for the service involved.

PART 3 – EXECUTION

3.01 GENERAL

The Contractor shall install valves in all locations shown on the plans or specified.

3.02 INSTALLATION

A. Valves shall be installed in the pipelines without springing or forcing. Valve stems shall be installed vertically upward from the pipe when possible. Do not install valve stem vertically down unless prior approval is obtained. Install all valves in a manner that allows future removal and service of the valve.

B. Temperature regulating valves, pressure reducing valves, and all equipment on the project shall have service valves installed on the water supply.

C. Provide a shut-off valve, union and dirt leg at each point where gas pipe connects to a piece of equipment.

Section 15140

CIRCULATING PUMPS

Part 1.00 GENERAL

1.01 GENERAL REQUIREMENTS

1.02 WORK INCLUDED

Provide the pumps as shown on the drawings and as specified herein for the mechanical system.

Part 2 – PRODUCTS

2.01 GENERAL

All pumps required for the work shall be new, of first class quality, and shall be furnished, delivered, connected and finished in every detail and shall be so selected and arranged as to fit properly into the building spaces. Pumps shall be protected at all times from dirt and moisture. During storage on the job site or construction, the Contractor shall keep pump ends plugged or capped to prevent dirt or moisture entering the pumps.

2.02 PUMP CHARACTERISTICS

A. All pumps shall have a capacity and head as shown on the drawings.
B. All pumps shall be selected for quiet operation.
C. Submit pump curves for approval.
D. All pumps shall be installed with the valves and fittings shown on the drawings.
E. Motor shall be drip proof, of the speed shown on the drawings and shall be specifically selected for quiet operation. The current characteristics of the motor shall be as shown on the drawings. The horsepower of the motor shall be as such a size as to ensure non-overloading of the motor throughout the capacity range of the pump.

2.03 IN-LINE TYPE PUMP

The pump shall be of the In-line type when used for re-circulating domestic hot water.

Part 3 – EXECUTION

A. Lubrication: After completion of the system and before start-up of the pump, the pump shall be lubricated in strict accordance with the manufacturer's instructions. A metal instruction plate shall be attached to the pump in a location where it is clearly visible. These instructions shall indicate the recommended frequency of lubrication.

B. Pump Alignment: Contractor shall check, test, and start each base mounted pump and shall have the pump manufacturer align the pump with a dial indicator within 0.002". Discharge and suction readings shall be recorded and forwarded for record purposes.

C. The pump shall be installed dead level, and shall not touch or rest on any part of the building structure.

D. The electrical connection through the pump shall be made through the use of flexible conduit (Greenfield) at least 18" long.

E. In-line pumps shall be so installed that the pump can be completely removed without the dismantling or removal of any piping or valves. No additional motor support will be allowed.

F. The adjacent piping shall be carefully fitted and erected so that the pump can be installed or removed from the pipe line without forcing or springing.

SECTION 15200

VIBRATION AND NOISE ISOLATION

PART 1 - GENERAL REQUIREMENTS

1.01 GENERAL

A. The work required under this Section shall conform to the requirements of "Division I, General Requirements," "Conditions of the Contract" and "Supplementary Conditions". Specific attention is called to the "Mechanical General Requirements" located in Section 15001.

1.02 WORK INCLUDED

A. Provide vibration isolation as indicated on the drawings and as described in this section.

1.03 SUBMITTALS

A. Submit manufacturers data sheets for proposed vibration isolation.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Mason

B. Kinetics

2.02 PUMPS

A. In-line pumps shall be supported by all thread rods with spring isolators.

2.03 IN-LINE FANS

A. In-line fans shall be supported by all thread rods with spring isolators or neoprene isolators as indicated on the drawings.

2.04 AIR HANDLING UNITS

A. Vertical air handlers shall be supported on rubber-in-shear pads at four corners.
B. Provide a canvas isolator where duct connects to an air handling unit or fan.

2.05 PIPING

A. Provide flexible pipe connectors in all pipe connections to rotating or reciprocating equipment. The connectors shall be fabricated of multiple plys of nylon cord, fabric and neoprene.
B. All connectors shall have a pressure rating of not less than 150 psi and a temperature rating of not less than 220.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install all vibration elimination devices as recommended by the manufacturer of the device.

3.02 ADJUSTMENT

A. Adjust all vibration isolation after it has been placed in operation.

3.03 CHECKING

A. Check all equipment for excessive vibration and correct any deficiencies.

Section 15250

INSULATION

PART 1 – GENERAL

1.01 GENERAL REQUREMENTS

1.02 WORK INCLUDED

Provide the insulation as specified herein for the mechanical systems.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Piping: Section 15060

B. Valves: Section 15100

C. Ductwork System: Section 15840

1.04 REFERENCE STANDARDS

A. NFPA 255 Latest Edition

B. A.S.T.M. E-84

C. UL – 723

D. ASHRAE 90-75

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Certain-Teed

B. Owens-Corning

C. Manville Products Corporation

D. Armstrong

2.02 DESCRIPTION

All insulation required for the work shall be new, of first-class quality an shall be furnished, delivered, and finished in every detail, and shall be so selected and arranged as to fit properly into the building spaces.

2.03 FIRE HAZARD RATING

All insulation shall have a composite (insulation, jacket or facing, and adhesive) fire hazard rating as tested by ASTM E-84, NFPA 255, or UL 723, not to exceed 25 flame spread and 50 smoke developed. Accessories such ass coatings, tapes, and adhesives shall have the same component ratings. All insulating materials or their containers shall have a label indicating compliance with the above rating.

2.04 CONCEALED

The word "Concealed" as used in this specification refers to insulation in furred spaces, pipe and duct shafts, unheated spaces immediately below roof, unexcavated spaces, crawl spaces, and tunnels. The word "exposed" refers to insulation in all other areas.

2.05 INSULATION MATERIALS AND THICKNESSES

A. Piping – Shall be insulated with the insulation materials and thickness as shown herein. All piping systems specified herein shall be insulated in their entirety throughout the building with the exception of storm and sanitary systems. Storm drain sumps and horizontal piping above finished areas shall be insulated. Sanitary piping and traps subject to freezing temperatures shall be insulated.

1. Domestic Cold, Hot & Hot Water Return and Condensate Drains – Glass fiber insulation with ASJ jacket
   Domestic Cold Water and Condensate Drains 1" thick
   Domestic Hot & Hot Water Return 1" thick
   K = 0.23 @ 75 degrees F

2. Cooling Coil – Glass fiber with ASJ jacket or elastomeric tubular 1" thick all pipe sizes
   K=0.25 @ 75oF

3. Refrigerant Piping- Closed cell elastomeric tubular 1" thick all pipe sizes
   K= 0.25 @ 75oF

4. Pipe Subject to Freezing - Shall be insulated as shown herein for each type of piping. Self-regulating heat tape shall also be provided.

B. Ducts- Shall be insulated with the insulation and thickness as shown herein:

1. Rectangular duct

a. Supply	1” liner (unless noted otherwise on plans)
b. Return	1” liner (unless noted otherwise on plans)
c. Exhaust	No insulation required

2. Round duct

a. Supply	2” fiberglass wrap
b. Return	2” fiberglass wrap
c. Exhaust	No insulation required

3. Exterior duct shall be insulated with 2” liner
4. Supply and return ducts located in the attic shall be insulated with 1' liner and 2” fiberglass duct wrap.
5. Concealed supply and return ducts at the pool area shall be insulated with 2” fiberglass duct wrap. Supply and return ducts at the pool area, which are exposed in the mechanical room shall be insulated with 2” thick rigid fiberglass board.

2.05 JACKETS AND FACINGS

A. Vapor barrier jackets and facings shall have a permeance rating not to exceed 0.02, puncture resistance not less than 50 Beach units, tensile strength not less than 35 lbs. Per inch width.

Part 3 – EXECUTION

3.01 APPLICATION

A. General

1. Insulation shall be installed in a workmanlike manner by workmen regularly engaged in this type of work.

2. Unless otherwise specified, the application of all insulation materials shall be in accordance with the manufacturer’s published recommendations.

3. Insulation shall not be applied until all surfaces are clean and dry. The insulation on pipe fittings, valves and pipe joints shall not be installed before the piping is tested and approved.

4. A complete vapor and moisture seal shall be provided over insulation on cold surfaces where vapor barrier jackets, facings, or coatings are required. Anchors, hangers, and other projections shall be insulated and vapor sealed to prevent condensation. All openings, punctures, and staples shall be sealed with vapor compound.

5. Insulation shall be continuous through hangers and wall and floor openings except at fire dampers. Insulated piping passing through rated walls and floors shall be provided with proset sleeves or caulked to maintain the rating of the assembly.

6. Insulation shall be applied to roof drain sumps, to all horizontal storm drain piping above grade other than piping in parking garages, and to sanitary traps subject to freezing.

7. Insulation applied over heat trace tape shall be the proper size for the pipe. Oversize insulation will not be allowed.

B. Jacket and Facing Application

1. Jackets and facings shall be securely and neatly applied to the insulation. Jackets and facings shall be drawn tight and all joints shall have laps or butt strips of material identical with the jackets or facings, secured with factory or field applied adhesive or with staples. Jackets on pipe insulation shall have not less than 1-1/2 inch lap at longitudinal joints and not less than 3 inch wide butt strips at end joints. Facings on blankets and board insulation shall have not less than 2 inch lap at all joints or 4 inch wide butt strips or pressure sensitive tape. Staples shall be spaced on 4 inch centers and 1 inch from edge of lap. The use of staples is at contractor's option where the surface to be insulated operates at below 60oF or on joints with factory applied lap adhesive (self sealing laps). However, if any openings or fish mouths develop, staples shall be applied and vapor sealed.

2. Jacket and facing laps and joint strips on cold work shall be secured and sealed with fire retardant vapor barrier adhesive. Laps and joints on hot work shall be secured and sealed with fire retardant adhesive.

C. Piping Insulation Application

1. Butt insulation firmly together and smoothly secure all jacket laps and joint strips. Ends of insulation on chilled water piping shall be sealed with vapor barrier coating at all fittings and valves and at every 21 feet of runs and pipes.

2. Fittings and valves: Insulate with molded fiberglass fittings, segments of pipe insulation, or with firmly compressed fiber glass blanket. Secure in place with 20 gage corrosion resisting wire and apply a smoothing coat of insulating cement. All fittings on cold pipe shall be additionally covered with open weave glass cloth embedded between 2 coats of vapor barrier mastic for cold pipe. In lieu of glass cloth and mastic or adhesive, contractor may use one piece pre-molded PVC fitting and valves covers installed in accordance with manufacturer's recommendations. Covers shall overlap adjoining pipe insulation and jackets.

    1. Outdoor Piping: Apply field or factory applied aluminum jacket 0.016 inch thick with barrier around pipe and slip edge into preformed lock positioned to shed water. Place preformed butt straps with sealant over the seams and secure with aluminum bands and seals. Fitting covers shall be prefabricated metal of the same composition as pipe jacket or fittings may be covered with a layer of glass cloth embedded between two coats of weatherproof mastic with a minimum thickness of 1/8 inch.

C. Duct and Air Handling Equipment Insulation Application

1. Blanket insulation: Apply insulation to duct with fire retardant adhesive sufficient to prevent sagging. Ducts over 30 inches in width shall have insulation further secured with mechanical fasteners on 18 inch centers maximum.

2. Rigid Board Insulation: Insulation shall be fastened to duct and equipment with mechanical fasteners not over 18 inches on centers and not over 3 inches from edges of insulation joints.

E. Hot Equipment Insulation Application

1. Hot Equipment (to 450oF operating temperature). Hot water storage tanks, water heaters, boilers, oil heaters, converters, etc. Blocks or boards shall be held in place with 18 gage galvanized steel wire on 9 inch centers. Apply galvanized wire netting (22 gage, 1 inch mech) and cover with a smoothing coat of insulating cement not less than ¼ inch thick and sufficient to give a smooth surface or 1" Armaflex may be used at contractor's option.

Section 15400

PLUMBING

PART 1 GENERAL

1.01 DESCRIPTION

A. It is the intent of these specifications to provide a plumbing system complete, fully adjusted, and ready for use.

1.02 REQUIRED WORK DESCRIBED IN OTHER SECTIONS

HVAC and Plumbing Systems	15000
Mechanical General Requirements	15001
Identification of Equipment and System	15047
Piping	15060
Valves	15100
Circulating Pumps	15140
Noise and Vibration Isolation	15200
Insulation	15250
Drains and Hydrants	15422
Cleanouts	15423
Gas Fired Domestic Water Heater	15425
Plumbing Fixtures and Trim	15450

1.03 QUALITY ASSURANCE

A. Qualification of Manufacturers' Products used in the work of this Section shall be produced by manufacturers regularly engaged in manufacture of similar items and with a history satisfactory production acceptable to the Architect.

B. Qualification of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and the methods needed for proper installation of the work of this section and of the work on the other required sections.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. General: All equipment shall be the capacity and types specified and as shown on the Equipment Schedule in the Drawings, and shall be listed manufacturer and model
number or shall be an equal approved in advance by the Architect.
B. Single Source: For ease of maintenance and parts replacement, to the maximum extent possible use equipment of a single manufacturer.

2.02 MATERIAL

All material required for a complete and proper installation shall be as specified and as selected by the Contractor subject to the approval of the Architect.

PART 3 EXECUTION

3.01 CONDITIONS

A. Inspection: Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

Verify that the work of this section may be completed in strict accordance with all pertinent codes and regulations, the approved Shop Drawings, and the manufacturers' recommendations.

B. Discrepancies: In the event of discrepancy, immediately notify the Architect.

Do not proceed in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 INSTALLATION OF EQUIPMENT

A. Locations: Install all equipment in the locations shown on the approved Shop Drawings, except where specifically otherwise approved on the job by the Architect.
B. Interferences: Avoid interference with structures, and with work of all other trades, preserving adequate headroom and clearing all doors and passageways to the approval of the Architect.
C. Inspection: Check each piece of equipment in the system for defects, verifying that all parts are properly furnished and installed, that all items function properly, and that all adjustments have been made.

3.03 PLUMBING CONNECTIONS FOR EQUIPMENT FURNISHED UNDER OTHER SECTION OF THE SPECIFICATIONS

1. Connections: The Contractor shall completely connect all equipment and/or fixtures requiring plumbing connections.
2. Additional Fittings: The Contractor shall provide and install all necessary traps, tailpieces & valves for equipment or fixtures.
3. Waste: The waste shall be the size necessary for drainage of the fixture or equipment and shall be roughed-in as called for on the approved shop drawings. The waste shall not be less than 1-1/2 inch pipe.
4. Exposed Piping: All exposed piping in finished areas shall be chromium plated. Exposed piping in all areas shall be kept to a minimum.
5. Special Equipment: For equipment installed and connected by others, the Contractor shall provide valved and capped water lines and floor drains, open site drains or approved waste connections as shown on the drawings.

C. Heating and Air Conditioning Equipment

1. Waste: The Contractor shall provide the necessary floor drains or open site drains for safety valves, or condensate drains of the equipment.
2. Water: The Contractor shall provide make-up water to the equipment with all required accessories such as service valve, union, backflow preventor, pressure reducer, pressure gauges, and shock arrestors.

3.04 CLOSING-IN OF UNINSPECTED WORK

A. General: Do not allow or cause any of the work of this section to be covered up or enclosed until it has been inspected, tested, and approved by the Architect and by all other authorities having jurisdiction.
B. Uncovering: Should any of the work of this section be covered up or enclosed before it has been completely inspected, tested, and approved, do all things necessary to uncover all such work. After the work had been completely inspected, tested, and approved, provide all materials and labor necessary and make all repairs necessary to restore the work to its original and proper condition at no additional cost to the Owner.

3.05 COOPERATION WITH OTHER TRADES

Do all things necessary to cooperate with other trades in order that all systems in the work may be installed in the best arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.

3.06 CLEANING

It is the intent of these specifications that all work including the inside of equipment, be left in a clean condition. All construction dirt shall be removed from material and equipment.

3.07 COMPLETENESS

It is the intent of these specifications to provide a complete system. Completeness shall mean not only that all material and equipment has been installed properly, but that all material and equipment has been installed and has been adjusted, and that, in the opinion of the Architect, all material and equipment is operating as designed.

3.08 ADJUSTMENT OF CONTROLS

This Contractor shall provide the personnel and equipment to completely adjust the controls to the satisfaction of the Mechanical Engineer. At the completion of the project, the Architect will arrange a meeting at the job site to allow the Contractor to demonstrate the proper operation of the plumbing controls.

Section 15422

DRAINS AND HYDRANTS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. The work required under this Section shall conform to the requirements of "Division I, General Requirements," "Conditions of the Contract" and "Supplementary Conditions". Specific attention is called to the "Mechanical and Electrical General Requirements" located in Section 15001.

1.02 WORK INCLUDED

A. Provide the drains and hydrants as shown by the schedule on the drawings and as specified herein.
B. A flashing clamp and collar shall be required where installed in a waterproof floor.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Piping: Section 15060

1.04 SUBMITTALS

A. Manufacturers' literature and illustrations

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Ancon
B. Josam
C. Smith
D. Wade
E. Zurn

2.02 TYPE

A. Drains and Hydrants shall be similar in all respects to the items shown on the schedule on the drawings.

2.03 DRAINS

A. Floor Drains (Finished Areas)

Shall be provided complete with all waste and vent connections. Drains shall have a cast iron body and cast brass adjustable strainer with the finish noted on the schedule.

B. Funnel Floor Drains

Drains receiving the waste from fixtures or equipment shall have the strainer modified to incorporate a funnel. The funnel shall be bronze to match the finish of the drain strainer. The bottom of the funnel shall be totally open. The floor drain strainer shall occur only between the perimeter of the funnel and the perimeter of the drain.

2.04 HYDRANTS

A. Wall Hydrants

Wall hydrants shall be the frost proof type with the hydrant seat in the heated area of the building. The hydrant shall be loose-key operated and the washer shall be replaceable from the exterior face. The wall hydrant shall have an approved vacuum breaker.

2.05 AUTOMATIC TRAP PRIMERS

Install an automatic trap primer on all toilet room drains and where noted on the drawings. Trap primers shall be installed from the nearest cold water line and shall be accessible. All exposed parts shall be chrome plated. Provide an escutcheon plate at the wall penetration.

PART 3 EXECUTION

3.01 INSTALLATION

A. Drains

Drains shall be installed at the low point of indicated slopes. Installation shall be such that ponding will not occur around the perimeter of the drain. When slopes are not indicated, the drain shall be installed one-half inch below normal finished surfaces.

B. Wall Hydrants

Wall hydrants shall be securely anchored to the wall construction to prevent loosening during use. Hydrants shall be installed 1'-6" above grade and flush with the finished wall.

3.02 WORKMANSHIP

A. All drains and hydrants shall be installed in an approved manner. All finished surfaces shall be protected during construction. All items shall be set level and installed as recommended by the manufacturer.

3.03 CLEANING

A. All of the above items shall be cleaned and all construction dirt removed at the completion of the project.

Section 15423

CLEAN-OUTS

PART 1 GENERAL REQUIREMENTS

1.01 GENERAL

A. The work required under this Section shall conform to the requirements of "Division I, General Requirements," "Conditions of the Contract" and "Supplementary Conditions". Specific attention is called to the "Mechanical and Electrical General Requirements" located in Section 15001.

1.02 WORK INCLUDED

A. Provide sanitary and storm drainage piping clean-outs as shown on the drawings and/or as required by administrative authority.

1.03 RELATED WORK SPECIFIED ELSEWHERE

Piping: Section 15060

Plumbing: Section 15400

1.04 SUBMITTALS

A. Submit manufacturers data sheets for proposed clean-outs.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Josam
B. Smith
C. Wade
D. Zurn

2.02 TYPE

A. Clean-outs shall be similar in all respects to the types specified herein and as detailed and noted on the schedule on the drawings.

Section 15425

GAS FIRED DOMESTIC WATER HEATERS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. The work required under this Section shall conform to the requirements of "Division I, General Requirements", "Conditions of the Contract" and "Supplementary Conditions". Specific attention is called to the "Mechanical and Electrical General Requirements" located in Section 15001.

1.02 WORK INCLUDED

Provide the heaters as shown on the drawings and as specified herein.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Piping: Section 15060

PART 2 PRODUCTS

2.01 GAS FIRED WATER HEATERS

A. Type

Factory authorized supervision of installation and startup of equipment shall be provided.

B. Capacity

The capacity and recovery shall be as shown on the drawings.

C. Certification

The complete package shall be supplied with U.L. and N.S.F. certification and labeling.

PART 3 EXECUTION

3.01 MOUNTING

The gas water heater shall be set dead level in both directions.

3.02 PIPING CONNECTIONS

The gas water heater shall have piping connections as shown on the drawings.

3.03 PROTECTION

The gas water heater shall be protected during construction and all solder and flux removed from the top.

3.04 CLEANING

The gas water heater shall be cleaned and all construction dirt removed at the completion of the project.

Section 15450

PLUMBING FIXTURES AND TRIM

Part 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. The work required under this Section shall conform to the requirement of "Division I, General Requirements," "Conditions to the Contract" and "Supplementary Conditions." Specific attention is called to the "Mechanical and Electrical General Requirements" located in Section 15001.

1.02 WORK INCLUDED

A. Provide the plumbing fixtures as shown by the schedule on the drawings and as specified herein.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Piping: 15060

Part 2 – Products

2.01 ACCEPTABLE MANUFACTURERS

A. Fixtures

1. See schedule on the drawings.

B. Fixture Trim

1. See schedule on the drawings.

C. Fixture Support

1. Josam
2. Smith
3. Wade
4. Zurn
5. Accepted Fixture Manufacturer

2.01 FIXTURE SUPPORTS AND CARRIERS

A. Supports and carriers shall be by a company regularly engaged in the manufacture of such devices. Material shall be steel or cast iron. Style shall be as recommended by the fixture manufacturer. Supports and carriers shall have the necessary adjustments to allow for irregularities of building construction.

2.02 FLUSH VALVES, FAUCETS, SUPPLIES, AND TRAPS

A. Exposed fixture trim shall be chrome plated. All trim of a similar function shall be by the same manufacturer. Vacuum breakers shall be included where there is a possibility of the fixture inlet being submerged. Provide chrome plated escutcheon plates where pipes penetrates walls. Provide valves for servicing the fixture. Fixture trim shall be of the prototype shown on the schedule on the drawings.

2.03 PLUMBING FIXTURES

A. Fixtures of similar material shall be by the same manufacturer.

B. Fixtures and trim shall be the models in the schedules on the drawings. Fixtures submitted for use on the project shall be identical in all respects to the ones in the schedules on the drawings.

Part 3 – EXECUTION

3.01 MOUNTING

Contractor shall obtain the necessary templates and dimensions from the manufacturer prior to rough-in.

For masonry construction, provide backing plates or rods in the wall with ¼" threaded rods anchored to the backing and extended thru the hanger supplied by the fixture manufacturer. Hanger shall be secured by nuts and washers. For construction other than masonry the fixture shall be mounted on a carrier securely bolted to the building structure with thru bolts or pre-set inserts. Shop drawings shall include information on fixture mounting. Floor mounted fixtures shall have supports, blocking, or grout setting bed as necessary to prevent movement or flexing. Countertop fixtures shall be sealed watertight in the countertop. All fixtures shall be mounted level and/or plumb and properly located in the building. All methods of securing the fixture shall present a finished appearance.

3.02 WATER AND WASTE CONNECTION

During project rough-in water and waste stub-outs shall be properly located to prevent unsightly gaps between fixtures and walls and to allow exposed pipe to be installed straight and plumb from the stub-out to the fixture. Piping shall be anchored to the wall construction, the fixture carrier, or the building structure to prevent movement after the fixture is set. Water piping shall be anchored with drop ear ells (sweat x f.i.p.) and shall be stubbed through walls with chrome plated brass nipples for connection to stops. Exposed copper at stops is not acceptable. Water and waste connections shall be made with trim identical in all respects to the prototypes given on the schedule on the drawings.

3.03 FIXTURE PROTECTION

Fixtures shall be protected during construction from dirt and physical damage. Dirty fixtures shall be cleaned and damaged parts or fixtures replaced.

3.04 TEST

Fixtures shall be given an in-service test. Make the necessary adjustments and demonstrate the proper operation of the fixture to the satisfaction of the Architect.

SECTION 15665

MAKEUP AIR UNITS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes rooftop heating and cooling units.

1.03 SUBMITTALS

A. Product Data: Include manufacturer's technical data for each model indicated, including rated capacities of selected model clearly indicated; dimensions; required clearances; shipping, installed, and operating weights; furnished specialties; accessories; and installation and startup instructions.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection. Detail mounting, securing, and flashing of curb to base.

1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring.

C. Commissioning Reports: Indicate results of startup and testing commissioning requirements. Submit copies of checklists.

D. Maintenance Data: Maintenance manuals specified in Division 1.

E. Warranties: Special warranties specified in this Section.

1.04 QUALITY ASSURANCE

A. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Code for Mechanical Refrigeration."

B. Energy Efficiency Ratio: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

C. Listing and Labeling: Provide electrically operated components specified in this Section that are listed and labeled.

1. The rooftop unit(s) shall be certified in accordance with UL Standard 1995 and ANSI Standard Z21.47

2. The rooftop unit(s) shall be safety certified by an accredited testing laboratory and the nameplate shall carry the label of the certification agency.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver rooftop units as factory-assembled units with protective crating and covering as recommended by the manufacturer.

B. Coordinate delivery of units in sufficient time to allow movement into building.

C. Handle rooftop units to comply with manufacturer's written rigging and installation instructions for unloading and moving to final location.

1.06 COORDINATION

A. Coordinate installation of curbs, equipment supports, and exterior wall penetrations.

1.07 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: A written warranty, executed by the manufacturer and signed by the Contractor, agreeing to replace components that fail in materials or workmanship, within the specified warranty period, provided manufacturer's written instructions for installation, operation, and maintenance have been followed.

1. Warranty Period, Compressors: Manufacturers standard, but not less than 5 years after date of startup but not to exceed 5 years from shipment.

2. Warranty Period, Heat Exchangers: Manufacturers non- prorated full parts replacement not less than 25 years after date of startup or 25 years from date of shipment.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to strict compliance with the requirements of this specification, provide products by one of the following:

1. Rooftop Units:

   a. AAON, Inc.

2.02 ROOFTOP UNITS

A. Description: Factory assembled and tested; designed for slab installation; and consisting of compressors, condensers, evaporator coils, condenser and evaporator fans, refrigeration and temperature controls, gas heater, filters, and dampers.

B. Construction:

1. Unit shall be completely factory assembled, piped and wired and shipped in one section.
2. Unit shall be specifically designed for outdoor roof top application with a fully weatherproof cabinet.
3. Cabinet shall be constructed entirely of G90 galvanized steel with the exterior constructed of 20 gauge or heavier material.
4. Paint finish shall be capable of withstanding at least 2000 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B 117-95 test procedure.
5. The unit roof shall be sloped or cross-broken to assure drainage.
6. Unit specific color-coded wiring diagrams shall match the unit color coded wiring and will be provided in both point-to-point and ladder form.
7. Diagrams shall also be laminated in plastic and permanently affixed inside the control compartment.
8. Access to filters, blower, heating section, and other items needing periodic checking or maintenance shall be through hinged access doors with quarter turn latches. Door fastening screws are not acceptable.
9. Access doors shall have stainless steel hinges and full perimeter gasket.
10. All openings through the base pan of the unit shall have upturned flanges of at least 1/2" in height around the opening through the base pan.
11. Air-side, service access doors shall have rain break overhangs.
12. All access doors shall have an internal metal liner to protect the door ½ inch thick, 1 ½ lb density, fiberglass, insulation.
13. The interior air-side of the cabinet shall be entirely insulated on all exterior panels with 1 inch thick, 1 1/2 lb. density fiberglass insulation.
14. Unit shall have decals and tags to indicate unit lifting and rigging, service areas and caution areas. Installation and maintenance manuals shall be supplied with each unit.

C. Supply Fans:

1. Blower(s) shall be entirely self-contained on a slide deck for service and removal from the cabinet.
2. All belt drive blower(s) shall have backward inclined airfoil blades.
3. All direct drive blower(s) shall have forward curved blades.
4. Adjustable V-belt drive shall be provided with a minimum rating of 140% of the motor nameplate brake horsepower when the adjustable pulley is at the minimum RPM.
5. Blowers, drives and motors shall be dynamically balanced.

D. Outside Air:

1. Shall be 0 - 100% with a motor operated outside air damper assembly constructed of extruded aluminum, hollow core, air foil blade with rubber edge seals and aluminum end seals. Damper blades shall be gear driven and designed to have no more than 25 CFM of leakage per sq. ft. of damper area when subjected to 2 in. w.g. air pressure differential across the damper. Damper motor shall be spring return to ensure closing of outdoor air damper during periods of unit shut down or power failure. No return air connection shall be present.

E. Condenser Options:

1. Air Cooled Condenser Section:
   a. The condensing section shall be equipped with vertical discharge axial flow direct drive fans. Direct drive fans shall be directly connected to and supported by the motor shaft.
   b. The condenser coils shall be sloped at least 30 degrees to protect the coils from damage.
   c. Condenser coils shall be copper tubes with aluminum fins mechanically bonded to the tubes.
   d. Condenser coils to be sized for a minimum of 10°F of refrigerant sub-cooling.

F. Filters: 2-inch- thick, fiberglass, throwaway with an ASHRAE efficiency of 30%

G. Evaporator Coils:

1. Evaporator coils shall be copper tube with aluminum fins mechanically bonded to the tubes.
2. Evaporator coils shall have galvanized steel end casings.
3. Evaporator coils shall have equalizing type vertical tube headers.
4. Evaporator coils shall be furnished with a thermostatic expansion valve.
5. Evaporator coils shall be furnished with a double-sloped drain pan for the positive drainage of condensate.

H. Refrigeration System:

1. Compressors shall be scroll type with internal thermal overload protection and mounted on the compressor manufacturer's recommended rubber vibration isolators. Each compressor shall have independent refrigerant circuits.
2. All units over 7 tons shall be multiple stage and shall have a minimum of 2 stages of capacity control.
3. Compressors shall be mounted in an isolated compartment to permit operation of the unit without affecting air flow when the door to the compartment is open.
4. Compressors shall be isolated from the base pan and supply air to avoid any transmission of noise from the compressor into the building area.
5. System shall be equipped with thermostatic expansion valve type refrigerant flow control.

6. System shall be equipped with automatic reset low pressure and manual reset high-pressure refrigerant controls.
7. Unit shall be equipped with Schrader type service fittings on both the high side and low-pressure sides of the system.
8. Unit shall be equipped with refrigerant liquid line driers.
9. Unit shall be fully factory charged with refrigerant.

Options:

a. Hot gas bypass shall be provided on the first refrigerant circuit.
b. Each compressor shall be individually staged for capacity control.
c. All circuits shall be equipped with liquid line sight glasses.
d. Unit shall be provided with a hot gas reheat coil and modulating hot gas reheat control valve piped to the lead refrigerant system
e. Unit shall be equipped with a 5 minute anti-short cycle delay timer for each stage.
f. Unit shall be equipped with 20 second between stage delay timers for each stage.
g. First stage cooling shall be provided to allow operation to 55°F.

I. Gas Heat Section:

1. Unit shall heat using natural gas fuel.
2. Unit shall be provided with a gas heating furnace consisting of an stainless steel heat exchanger with multiple concavities, an induced draft blower and an electric pressure switch to lockout the gas valve until the combustion chamber is purged and combustion air flow is established. Drum type heat exchangers or heat exchanger tubes with separate internal turbulators are not acceptable.
3. Unit shall be provided with a gas ignition system consisting of an electronic ignitor to a pilot system, which will be continuous when the heater is operating, but will shut off the pilot when heating is not required.
4. Unit shall have gas supply piping entrances in the unit base for through the curb gas piping and in the outside cabinet wall for across the roof gas piping.
5. Unit shall be equipped with a Stainless Steel tubular heat exchanger with a 25 year non pro-rated warranty.
6. Unit shall heat using natural gas and be equipped with a dual 2-stage gas valves for 4-stage heating, adjustable speed combustion blower and stainless steel tubular heat exchanger. The heat exchanger shall have a 25 year non pro-rated warranty.

J. Controls:

1. Make Up Air Unit Controller

MUA programmable controller shall be a Wattmaster/Orion MUA-II controller mounted internal to the rooftop unit with dewpoint sensor; electronic sequencing of compressors and heating and modulating hot gas re-heating.

The outside air temperature and the humidity sensors shall be factory mounted. The unit manufacturer shall provide the supply air temperature sensor for field installation by others.

2.05 CURBS

A. Support curbs shall be constructed of galvanized steel. Curbs are to be fully gasketed between the curb top and unit bottom with the curb providing full perimeter support, cross structure support and air seal for the unit.

OPTIONS:

1. Unit shall be mounted on a factory furnished acoustical style solid bottom roof curb, fully lined with 1" of neoprene coated, fiberglass insulation and with a wood nailer strip. Curb height to be a minimum of 30” tall to accommodate a field cut opening in side of curb for horizontal air discharge.

3.0 STARTUP

Units to be started and commissioned by a factory authorized service organization. Commissioning reports shall be provided upon startup completion.

15720
POOL DEHUMIDIFICATION UNIT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the water-cooled pool dehumidification unit.

1.03 SUBMITTALS

A. Product Data: Include manufacturer's technical data, including rated capacities of selected model clearly indicated; dimensions; required clearances; shipping, installed, and operating weights; furnished specialties; accessories; and installation and startup instructions.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring.

C. Maintenance Data: Maintenance manuals specified in Division 1.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver the pool unit as factory-assembled unit with protective crating and covering as recommended by the manufacturer.

B. Coordinate delivery of the unit in sufficient time to allow location in the pool mechanical room.

1.06 COORDINATION

Coordinate installation of vibration isolation, duct connections, pipe connections, electrical connections and interface with the duct mounted gas furnace.

PART 2 – PRODUCTS

2.01 General

The dehumidifier shall be custom configured units. Each unit shall include compressor(s), evaporator (dehumidifying) coil, condenser coil (air reheat), coaxial condenser (pool water heat), supply air blower(s), high efficiency blower motors, motor and compressor starters, and all controls factory assembled, in one complete enclosure. All controls shall be factory adjusted to the design conditions.

1. The unit shall be designed for indoor installation and be of vertical configuration.
2. The unit shall be designed for corner installation with access to all components from a single side.

2.02 Principle of Operation

The unit shall provide precise environmental control without wide swings in room air temperature or humidity conditions..

1. The unit shall operate according to the following sequence. The warm humid air from the natatorium shall pass through the dehumidifying coil and by cooling it below its dew point, moisture shall be condensed effecting the dehumidification process. The heat captured by this process and the heat generated by the compressor power consumption are absorbed by the mechanical refrigeration system and then distributed as specified herein.

2. Besides humidity control, the first priority is to maintain the pool water temperature by rejecting compressor heat through a water-cooled condenser. An automatic compensation system shall proportionally direct the heat where it is required and permit unit start-up regardless of water temperature. During initial start-up with low pool water temperature, all available heat shall be directed to the pool water. Once the desired pool water temperature is reached, the water heating system shall adjust its output automatically. Unit shall be equipped with field adjustable water heating capacity accessed externally (with air conditioning).

3. The unit shall shall be equipped with the control logic that allows the system to continue to dehumidify and air condition normally regardless of waterflow rate. The unit will only sound an alarm if the water flow is beyond +/- 20% of the specified flow rate. The water temperature difference between the inlet and the outlet shall not exceed 20 °F in all operating modes to allow for the use of non-metallic piping on pool water mains. Water temperatures exceeding 120 °F shall not be acceptable.

2.03 CABINET

A. The units shall be constructed of 16-gauge zinc coated, corrosion resistant cold rolled steel painted with baked epoxy powder paint, reinforced for maximum rigidity with a 14-gauge base. Cabinet shall have one section for the blower, compressor and water heater(s) and a second section for the coils and drain pan.

B. The unit shall be vertical configuration with compressor out of the air stream. The unit shall be designed for single side access.

C. Removable service panels shall be furnished to provide access to all internal parts from both sides and in both sections.

D. Each unit shall have a built-in electrical control panel in a separate compartment in order not to disturb the air flow within the dehumidifier during electrical servicing.

E. The unit shall be equipped with an opening suitable for connection of a duct to admit outdoor air to comply with ASHRAE Ventilation Standard 62-1989. Outdoor air intake assembly shall be welded to become an integral part of the enclosure. The section shall be painted internally and externally. It shall have a built in air filter rack with separate hinged access door and manual air balancing dampers.

2.04 COILS

A. All coils shall be sized for an air velocity not to exceed 500 fpm, and shall be constructed of seamless copper tubing mechanically expanded to assure high heat transfer with maximum of twelve aluminum fins per inch.

B. Fins shall be aluminum, HyPoxy coated prior to assembly, or shall be copper.

C. Coils shall have a 16-gauge galvanized casing and end plates. And shall be coated with 660 Clear Coat.

D. Coils shall be factory tested at air pressures not less than 400 psig in a water bath.

2.05 EVAPORATOR (DEHUMIDIFICATION COIL)

A. Shall be a minimum of eight rows deep for maximum moisture removal capacity.

B. An adjustable motorized by-pass damper shall be installed above the evaporator coil for evaporator frost free dew point control. Compressor capacity reduction methods are not acceptable for coil dew point control, as reduced capacity operation prolongs the water heating process.

2.06 AIR REHEAT CONDENSER COIL

A. Shall be a minimum of four rows deep, and shall be sized to transfer up to 100% of the compressor heat of rejection into the air when necessary.

2.07 WATER HEATER

A Shall be sized specifically for the water heating requirements. Systems requiring more water flow must submit the larger pipe, pump and increased annual operating cost requirements.

B Shall be coaxial for maximum heat transfer from refrigerant to potable water and have cross contamination prevention feature. Pool heater shall be corrosion resistant, cupro-nickel water circuit, self-purging and self-draining counter flow design. Water circuit shall be supplied with self-aligning union fittings for easy connection. The internal water circuit of the unit shall be smooth, valveless, and designed for constant water flow.

2.08 DRAIN PAN

A. Each unit shall be equipped with a sloped drain pan under the entire evaporator coil and prevent condensate carryover.

B. The drain pan shall be made of 12-gauge grey Noryl plastic with hair cell finish , temperature resistant to 200 °F complete with recessed bottom drain, sanitary round corners, and flush mounted stainless steel strainer for minimum condensate collection in pan. Drain connection shall be suitable for 1-1/2 inch P-trap connection using compression ring fitting for easy disassembling and cleaning.

2.09 BLOWERS

A. Shall be double width, double inlet, multi-blade forward curved dynamically and statically balanced and tested, mounted on a solid steel shaft coated with silicon.

B. Shall have a galvanized steel wheel and galvanized steel casing painted with a baked enamel finish.

C. Bearings shall be grease-lubricated, self-aligning for 200,000 hours average life.

2.10 BLOWER MOTORS

A. Shall be premium grade, high efficiency type, totally enclosed fan-cooled or open drip-proof type as scheduled, with class B insulation, induction type, 40 °C rise, pre-lubricated ball bearings mounted on an adjustable base.

B. Shall have a service factor rating of 1.15 or higher and must be stamped or marked high efficiency.

2.11 BLOWER BELT DRIVE ASSEMBLY

A. Shall be double V-belt with a service factor not less than 1.2 based on nominal motor horsepower, dynamically balanced cast iron fixed pitch blower sheave and dynamically balanced cast iron variable pitch motor sheave.

2.12 COMPRESSORS

A. Shall be semi-hermetic compressor(s), reciprocating type, or high efficiency scroll type as scheduled, suitable for refrigerant R-22, equipped with internal solid state thermal protection sensor, service valves, easily removable crankcase heater for liquid migration protection, spring mounted, muffler plate on the discharge valve, oil pump for forced lubrication, oil level sight glass, and shall be suitable for reduced voltage starting where scheduled for 208-230 volt service. Provide controls for pump down cycle protection and oil failure protection.

B. Compressor motors shall be refrigerant suction gas cooled, high torque, induction type, 1750 RPM, with inherent thermal protection in all three phases. Compressors shall be mounted on rubber in shear vibration isolator pads to minimize noise and vibration transmission.

C. Compressor(s) shall have a four (4) year extended replacement warranty (5-years total).

2.13 REFRIGERATION CIRCUIT

A. Shall have a liquid line filter drier, liquid and moisture indicator visible from outside the unit without removal of the access panel, thermostatic expansion valve, pump down solenoid valve.

B. Tamper proof, hermetically sealed non-adjustable high and low pressure controls and refrigeration service valves shall be installed using Schraeder type valves.

C. Refrigeration service valves shall be provided.

D. The pool unit shall include an oil separator package

E. Suction line shall be fully insulated with not less than 1/2 inch closed cell insulation.

F. The manufacturer shall review the planned installation, and provide a liquid refrigerant receiver, sized appropriately to hold the refrigerant operating charge, and provide for year-round, low ambient operation down to –20°F.

2.14 CONTROL PANEL

A. Shall be built-in within a separate compartment in order not to disturb the air flow during servicing.

B. Blower motor(s) and compressor(s) shall be controlled by contactors, and shall be protected with push-button operated, adjustable thermal trip and fixed magnetic trip overloads.

C. Power block terminal shall be provided for proper wire size.

D. Dry contacts shall be provided for alarm, auxilliary heating, remote air cooled condenser, blower interlock, building fire or smoke safety shutdown, and other functions as outlined in the sequence of operations.

E. Color coding and wire numbering shall be provided for easy troubleshooting. All wires shall be in a wire duct.

F. Compressor(s) shall have a time delay start to prevent short cycling.

G. All wiring shall be installed in accordance with UL or CSA safety electrical code regulations, and shall be in accordance with NFPA. All components used shall be UL or CSA listed.

2.15 MICROPROCESSOR CONTROL

A. Microprocessor Controller shall be HT-800.

B. Unit shall be monitored and controlled with a solid state microprocessor system with remote mounted control panel located in the pool room. Programmable thermostats and electromechanical controls shall not be acceptable.

C. The following LED indications shall be provided on the remote control panel:

1. System On - Indicates that the environment control system is on and the blower is running.

2. Dehumidify - Indicates that the system is dehumidifying the space and recycling the energy where required.

3. Cool - Indicates that the air conditioning mode (OPTIONAL) is operating.

4. Pool Heat - Indicates that the system is heating the pool water with recycled energy.

5. Aux Heat - Indicates that the auxiliary space heating is operating.

6. Service - Flashes to indicate that the unit requires service. A service code shall be provided so that a service diagnosis can be performed quickly and efficiently. Built-in diagnostics shall be provided to detect:

a. Sensor failures
b. Refrigerant high and low pressure
c. Communication fault
d. System off
e. Anti-short cycle delay

D. The following setpoints shall be accessible on the remote control panel LED display:

1. Space temperature
2. Space relative humidity

E. The following monitored conditions shall be available on the remote control panel LED display:

1. Space temperature
2. Space relative humidity
3. Pool water temperature
4. Evaporator air temperature
5. Supply air temperature
6. Service codes from built-in diagnostics

F. The following keys shall be provided on the remote control panel:

1. System on/off - Controls the on/off status of the entire system. Blower shall continue to operate.

2. Service - used in conjunction with service codes and built-in diagnostics to troubleshoot the system.

3. Display - used to select the information shown on the LED display.

4. Up and down arrow - used to adjust setpoints and scroll through service codes.

G. The following sensors shall be factory mounted in the unit:

1. Return air temperature
2. Supply air temperature
3. Air off evaporator temperature
4. Return air relative humidity
5. Entering pool water temperature
6. Leaving pool water temperature

H. The following sensors shall be factory mounted in the remote control panel:

1. Space air temperature.

I. The remote control panel shall be easily detachable from the room location and plug directly onto the unit to simplify initial start-up and service diagnosis.

J. The remote control panel shall be connected to the unit via a three-wire shielded cable.

2.16 AIR FILTERS

A. Shall be 2 inch thick, 30% efficient disposable pleated type, suitable for commercial application, sized for an average velocity not to exceed 450 feet per minute.

B. Unit shall have an extended filter rack with hinged access door. Filters shall be at least 8 inches from the evaporator coil face.and be arranged for even air distribution across the dehumidifier coil.

2.17 WATER COOLED AIR CONDITIONING

A. The packaged natatorium unit shall be equipped with an air conditioning feature to reject surplus heat to the condenser water loop which serves the water source heat pumps.

PART 3 – EXECUTION

3.1 UNIT SELECTION

A. Basis of design is Dectron DRY-O-TRON Model Series DSV for indoor installation, with water cooled condenser by the same manufacturer.
B. Acceptable manufacturers ar Dectron and Dry-Air

3.2 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Handle unit carefully to prevent damage, breaking, denting and scoring. Damaged units or damaged components shall not be installed.

B. If unit is to be stored prior to installation store in a clean, dry place. Protect from weather, dirt, fumes, water, construction and physical damage.

C. Comply with manufacturer's rigging and installation instructions for unloading the unit and moving it to the final location.

3.3 INSTALLATION

A. Execute the work in accordance with the specifications and in accordance with the manufacturer's instructions and only by workmen experienced in this type of work.

B. Provide condensate drain trap in accordance with the manufacturer's instructions, and provide condensate disposal piping as shown on the plans.

C. The unit shall not be used for temporary heating or cooling during the construction phase. Clean the unit of all construction dust and debris prior to any operation. The unit shall not be operated until the space has been cleaned, the pool has been filled, and the entire system ready for permanent commissioning.

D. Provide the services of the Manufacturer's authorized service technicians to perform check, test, and start-up of the equipment, and to provide operation and maintenance instructions to the owners designated personnel.

Section 15830

POWER ROOF VENTILATOR

Part 1.00 GENERAL

1.01 WORK INCLUDED

Provide the power roof ventilators as shown on the drawings and as specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Ductwork Systems: Section 15840

1.03 REFERENCE STANDARD

A. Applicable AMCA Standards

Part 2.00 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Greenheck
B. Cook

2.02 POWER ROOF VENTILATOR

A. Type

1. The ventilator shall be direct-driven centrifugal type, with spun aluminum housing for roof mounting, and shall be completely weatherized.

B. Capacity

1. Capacity shall be a minimum of the quantities shown on the drawings.

C. Fan

1. Shall be the backwardly inclined type with centrifugal wheel that has been statically and dynamically balanced at the factory.

D. Motor

1. The motor shall be installed in a totally enclosed weatherproof housing outside the air stream. The electric characteristics for the motor shall be as shown on the drawings.

E. Disconnect Switch

1. A factory-wired, non-fused disconnect switch shall be located under the hood of the unit.

F. Backdraft Dampers

1. Shall be installed in the curb of the unit unless specifically shown otherwise on the drawings.

G. Curb

1. The fan shall be installed on the roof as detailed on the drawings.

H. Bird Screen

1. The entire air outlet of the fan shall be protected by ½" x ½" aluminum mesh securely installed in place.

Part 3.00 EXECUTION

3.01 START-UP AND CHECK-OUT

A. General

1. The Power Roof Ventilator shall be started up and checked out only after all connections have been made and the Power Roof Ventilator is clean

B. Check

1. Vibration
2. Electrical Connections
3. Rotation of Fan

C. Correct all functional deficiencies and place in operation.

Section 15840

DUCTWORK SYSTEM

PART 1.00 GENERAL

1.01 WORK INCLUDED

A. Provide the ductwork systems as shown on the drawings and as specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Air Distribution: Sections 15867

B. Insulation: Section 15250

C. Testing and Balancing: Section 15896

1.04 REFERENCE STANDARDS

A. SMACNA, “HVAC Duct Construction Standards, Metal and Flexible” (latest publication)

B. NFPA 90A

Part 2.00 PRODUCTS

2.01 GENERAL

A. All materials and specialties required for the work shall be new, of first-class quality, and shall be furnished, delivered, erected, connected and finished in every detail, and shall be so selected and arranged as to fit properly into the building spaces allotted. Where no specific kind or quality is specified, a first-class standard article as approved by the Architect shall be provided. All ductwork shall be protected at all times from dirt, water, and debris. During storage on the job site of construction, the Contractor shall keep duct ends covered to prevent foreign objects from entering the ductwork.

2.02 CONSTRUCTION OF DUCTWORK

The ductwork system shall be constructed in accordance with the SMACNA applicable manuals.

2.03 PRESSURE CLASS OF DUCTWORK

Shall be in accordance with the applicable SMACNA manual for the pressure class shown.

2.04 FIRE DAMPERS

A. Type

1. Dampers shall meet local codes and the standards of the NFPA Bulletin 90A. Dampers shall be sized so that the free air space is not less than the connected duct free air space. Location shall be as shown on drawings and as required by local code. Dampers shall be dynamic rated.

B. Material

1. The frame shall be constructed so as to be unaffected by corrosion or high heat. Mechanical parts shall have bronze non-corrosive pins. When closed, the dampers shall be held closed by a catch arrangement. Blades installed in regular ductwork will not be accepted.

C. Fuse Links

1. Fire dampers shall be arranged to close automatically and remain tightly closed upon the operation of an approved fusible link or other approved heat-actuated device, located where readily affected by an abnormal rise of temperature in the duct. Fusible links shall have a temperature rating approximately 50oF above the maximum temperature that would normally be encountered when the system is in operation or shut down.

D. Workmanship

1. Fire dampers shall be installed so as to provide a positive barrier to passage of air when in closed position.

Dampers shall be installed so they will be self-supporting in case of duct destruction due to heat. Care must be exercised that the frame be set so that the closing device will not bind.

E. Access Holes

1. Suitable hand hole openings with tightly fitted covers shall be provided to make them accessible for inspection and maintenance.

2.05 FLEXIBLE TYPE DUCT

A. Duct Material

1. Flexible type duct shall be of a two-element spiral construction composed of a corrosion-resistant metal supporting spiral and coated fabric with a mineral base. Flexible duct connectors shall be listed by Underwriters' Laboratories, Inc., Class 1 ducts, and shall have a flamespread rating not exceeding 25 and a smoke developed rating not exceeding 50. Fuel contributed rating not exceeding 50. Flexible duct shall be Wiremold 57.

B. Duct Workmanship

1. The flexible ducts shall be installed with a minimum run and with a minimum of bends. No run shall exceed twelve (12) feet and bends shall have a minimum radius of one and one-half times the diameter of the duct measured from the centerline. They shall not exceed 20 square inches when penetrating a floor. All joints and connections shall be sealed. Joint material shall conform to flamespread rating as listed.

C. Flamespread Rating

1. Ducts 8 inches and smaller shall have a rating of not over 50 without evidence of continued progressive combustion. Larger ducts shall have a rating of not over 25 without evidence of continued progressive combustion and a smoke developed rating not higher than 50.

D. Code

1. All ductwork shall conform to local codes and latest NFPA Bulletin 90A.

E. Installation

1. Install duct in fully extended condition as far as practical, using only the minimum length required to make the connection. Installation of ducts in compressed or partially compressed condition will noticeably increase friction loss.

2. Where it is necessary to support horizontal runs to prevent shifting, make certain that the duct is fully extended between supports.

F. Insulation

1. The flexible duct connection shall be preinsulated with 1-inch insulation glass fiber wherever the adjacent trunk duct is specified to be insulated.

G. Pressure Rating

1. The flexible duct connection shall be suitable for 1-1/2 times the duct pressure at the connection.

PART 3.00 EXECUTION

3.01 DUCT WORKMANSHIP

A. All ductwork shall be constructed and erected in a workmanlike manner. Ducts shall be straight and smooth on the inside with neatly finished joints, airtight, and shall be free from vibration under all conditions of operation. The internal ends of slip joints shall be securely attached to the building construction in an approved manner. Changes in dimensions and shape of ducts shall be gradual . All duct sizes fall within the limiting dimensions on the drawings unless otherwise approved. Curved elbows, unless otherwise specified on the drawings, shall have a centerline radius equal to 1-1/2 times the width of the duct. Air turns shall be installed in all abrupt elbows and shall consist of curbed metal blades or vanes, arranged to permit the air to make the turns without appreciable turbulence. They shall be the manufacturer's standard product and shall be quiet when the system is in operation. Configuration of ducts shall be as shown by the detail on the drawings.

3.02 CHECKING

A. Check space allocation to be certain duct will fit before fabrication.

B. Check all connections to equipment for size and type of connection before fabrication.

C. Coordinate duct runs with other sections such as sprinkler, light and conduits.

3.03 DUCT SUPPORTS

A. All ducts shall be supported from the building structure in a neat and workmanlike manner and wherever possible, parallel runs of horizontal ducts shall be grouped together on trapeze hangers. Vertical riser ducts shall be supported at the flow line with steel angles to the floor construction. Hanging ducts from other pipes or ducts will not be permitted. Duct supports shall be in accordance with the SMACNA manuals.

Section 15896

TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEM

PART 1.00 GENERAL

1.01 WORK INCLUDED

A. The HVAC systems will be tested and balanced by an independent, certified test and balance contractor.

PART 2.00 PRODUCTS – not applicable

PART 3.00 EXECUTION

3.01 TESTING PROCEDURE

The air balance agency shall perform the tests and balance on each and every separate system in the building as described in Part 3.

3.02 SCOPE OF WORK FOR THE CONSTANT VOLUME AIR CONDITIONING SYSTEMS

A. Test and record motor load amperes.
B. Test and adjust system for design and return air.
C. Test and adjust system for design outside air.
D. Test and record entering air temperatures (D.B. heating and cooling).
E. Test and record entering air temperatures (W.B. cooling).
F. Test and record leaving air temperatures (D.B. heating and cooling).
G. Test and record leaving air temperatures (W.B. cooling).
H. Adjust all main supply and return air ducts to proper design CFM.
I. Adjust all zones to proper design CFM, supply and return.
J. Test and adjust each diffuser, grille, and register to within 10% of design requirements.
K. Readings and tests of diffusers, grilles, and registers shall include required FPM velocity and test resultant velocity; required CFM and test resultant CFM after adjustments.
L. As a part of the work of this contract, the Contractor shall make any changes in the pulleys, belts, and dampers or the addition of dampers as required for correct balance as recommended by air balance agency, at no additional cost.

3.04 SCOPE OF WORK FOR THE TOILET EXHAUST AIR SYSTEMS

A. Test and adjust exhaust fan RPM to design CFM requirements as shown by the details on the drawings.
B. Test and record motor load amperes for the exhaust fan at design conditions.
C. Test and adjust each grille or register to within 10% of design requirements.
D. Each grille, diffuser and register shall be identified to location and area.
E. Readings and tests of diffusers, grilles and registers shall include required FPM velocity and test resultant velocity; required CFM and test resultant CFM after adjustments.

SECTION 16000

ELECTRICAL - GENERAL PROVISIONS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. The general provisions of the Contract including General and Supplementary Conditions, Division 1 - General Requirements, and Instructions to Bidders apply to the Work of in this Division.

1.02 WORK INCLUDES

A. Work covered by this specification shall include furnishing all labor, materials, equipment and services required to construct and install the complete electrical system shown on accompanying plans and specified herein.

B. This work shall include: The general layout of the complete electrical system; arrangement of feeders, circuits, outlets, switches, controls, panelboards, service equipment, fixtures, and other work. No rough in or connections, etc., for Mechanical Equipment shall be done until coordination is completed with Division 15 Contractor.

1.03 RELATED WORK

A. The Contractor shall be familiar with any work specified elsewhere in these specifications. He shall perform this work as if specified herein.

1.04 PERMITS AND INSPECTIONS

A. Contractor shall give all necessary notices; obtain all permits, and pay all governmental taxes, fees and other costs in connection with his work; file all necessary plans; prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; obtain required Certificates of Inspection for his work and deliver same to Architect-Engineer before request for acceptance and final payment of work.

B. Contractor shall include in the work, without extra cost to the Owner, all labor, materials, services, apparatus, drawings, etc. necessary to comply with all laws, ordinances, rules and regulations, whether or not shown on the drawings and/or in the specifications.

1.05 CODES AND STANDARDS

A. The following specifications and standards, of issues listed below, but referred to thereafter by basic designation only, form part of these specifications:
1. National Electrical Code (NEC) NFPA 70.
2. National Fire Protection Association's Recommended Practices.
3. Local, City and State Codes and Ordinances.
4. National Electrical Safety Code.
5. Underwriters Laboratories, Inc. (UL).
6. Illuminating Engineering Society (IES).
7. Institute of Electrical and Electronic Engineers (IEEE).
8. Insulated Power Cable Engineers Association.
9. National Electrical Manufacturers Association (NEMA).
10. American National Standards Institute (ANSI).
11. American Society for Testing Materials (ASTM).
12. State Fire Prevention Code.

13. Occupational Health Safety Act (OSHA).
14. Service Requirements of serving utility company.
15. Life Safety Code - NFPA 101.
16. Americans with Disabilities Act (ADA).

The latest specifications and standards available shall be used for the above.

1.06 REVIEW OF MATERIALS

A. It is the intent of these Specifications to establish quality standards of materials and equipment installed. Therefore, specific items are identified by manufacturer, trade name or catalog designation.

B. Submit manufacturer's catalog sheets and/or shop drawings covering all phases of work included in this contract, in accordance with Section 01300 of this Specification.

C. Submittals shall be arranged in sets and bound. Material shall be organized into indexed sections corresponding to specification sections. No loose sheets will be acceptable. All data shall be submitted at one time. Partial submittals will not be accepted for review.

D. All submittals shall bear written certification to the effect that the Contractor has examined them and found them to be in accordance with Specifications and to be dimensionally correct with reference to available space and to related trades. Each submittal shall be signed and dated by the Division 16 Contractor.

E. Submittals are required even when equipment being furnished is exactly as specified. Each sheet of submitted data shall be thoroughly edited to clearly indicate which features and/or options are being proposed.

F. Substitution of equipment shall be in accordance with Supplementary General Conditions of the Specification. Refer to Section 01600.

G. Any proposed substitutions of equipment shall be accompanied by shop drawings showing revised equipment layout and wiring diagrams. Where substituted equipment furnished requires use of larger, more, or differently arranged connections, such connections shall be installed to the complete satisfaction of Architect-Engineer without additional cost to Owner.

H. Should a substitution be accepted and subsequently proven unsatisfactory for the service intended within the warranty period, the Contractor shall replace this material or equipment with that as originally specified, or corrected as directed by the Architect-Engineer.

I. Where substitutions alter the design or space requirements indicated on the drawings, the Contractor shall include all items of cost for the revised design and include cost of all allied trades involved.

J. Acceptance or rejection of the proposed substitutions shall be subject to the approval of the Architect-Engineer. If requested by the Architect-Engineer, the Division Contractor shall submit for inspection samples of both the specified and proposed substitute items.

K. In all cases where substitutions are permitted, the Contractor shall bear any extra cost of evaluating the equality of the material and the equality of the material and the equipment to be installed.

L. The Contractor shall submit to the Architect-Engineer, detailed dimensioned shop drawings covering all items of electrical equipment. No equipment should be put into manufacture or ordered until these shop drawings or brochures have been reviewed by the Architect-Engineer.

M. In the event resubmittal is required, the Contractor shall revise the shop drawings as directed by the Architect-Engineer. The Contractor shall then resubmit the corrected shop drawings to the Architect-Engineer for final review.

N. Upon completion of the Project, this Contractor shall prepare and deliver to the Architect-Engineer 1 set of reproducible "RECORD SET" drawings, showing actual installed locations of all electrical conduits, ducts, and cables outside and inside of the buildings, including the location of all underground junction boxes, pull boxes, or handholes. Make all necessary field measurements during the installation of the electrical work. Refer to Section 01700.

1.07 DEVIATIONS

A. The drawings, which constitute an integral part of this contract, shall indicate the general layout of the complete electrical systems; arrangement of feeders, circuits, outlets, switches, controls, panelboards, service equipment, fixtures and other work.

B. Field verification of scale dimensions on the drawings is directed since actual locations, distances, and levels will be governed by actual field conditions.

C. The Contractor shall check Architectural, structural, plumbing, heating and ventilating drawings to avert possible installation conflicts. Should drastic changes from original drawings be necessary to resolve such conflicts, the Contractor shall notify the Architect-Engineer and secure written approval and agreement on necessary adjustments before the installation is started.

D. The drawings may be superseded by later revised or detailed drawings or specification addenda prepared by the Architect-Engineer, and the Contractor shall conform to all reasonable changes without extra cost to the Owner. All items not specifically mentioned in the specifications or noted on the drawings, but which are obviously or normally necessary to make a complete working installation, shall be included.

1.08 SITE UTILITIES

A. Locations and elevations of various utilities, included within the scope of this work, have been obtained from existing plans and/or other substantially reliable sources, and are offered as a general guide only without guarantee as to accuracy. This Contractor shall examine the Site and verify to his own satisfaction the locations and elevations of all utilities and shall adequately inform himself of their relations to the work before entering into contract.

B. Before ordering equipment and starting the job, this Contractor shall verify the voltage with the utility company. If voltage differs from that noted on the drawings and in the specifications, the Architect-Engineer shall be notified at once. If the Architect-Engineer is not notified before equipment is ordered or construction is started, this Contractor shall provide an acceptable and operable system at no additional cost to the Owner.

C. Exterior utilities shall include all conduit and appurtenances outside of the building or as shown on the drawings. Unless otherwise noted, utilities shall include complete tie-in with utility lines at no extra cost to the Owner. The Contractor shall pay all costs required by utility company pertaining to construction and tie-in. Any deposits required for permanent service will be paid by the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All materials and equipment shall be new and of the best quality normally used in good commercial practice, being products of reputable manufacture.

PART 3 - EXECTUTION

3.01 INSTALLATION

A. The Owner shall retain the right to reject any materials and/or workmanship which is not in accordance with those specified, either before or after installation.

END OF SECTION

SECTION 16100

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. The General Conditions, Instructions to Bidders, and all other general requirements of these specifications shall be considered a component part of this division of the specifications.

B. Bidders to this section shall review all other sections of these specifications. All items in other sections relating to this section are as binding on this bidder as if repeated herein.

1.02 SCOPE

A. This section of the specifications covers only the basic materials, methods, and accessories related to the electrical systems for this project. Attention is directed to all other sections of this division of the specifications.

PART 2 - PRODUCTS

2.01 CONDUIT SYSTEMS

A. Rigid steel conduit shall be Underwriters' approved hot-dip galvanized or zinc metallized. Couplings, locknuts and bushings shall be zinc coated and threaded. "Erickson" couplings may be used where necessary.

B. Electrical metallic tubing shall be zinc coated. Couplings and connectors shall be galvanized or sherardized steel, concrete-tight, with insulated throat, of the glandular compression ring or tap-on bushed and insulated type. Die Cast, setscrew, and pressure indented type may be used only where separate ground conductor is installed in each conduit.

C. Plastic conduit shall be high impact, schedule 40, PVC conforming to industry NEMA standards and equal to Carlon type 40 heavy wall rigid PV-Duit or Carlon type EB power and communication duct. All joints and fittings shall be of same material and shall be solvent welded.

D. Flexible conduit for motor connections and all wet locations shall be American Brass "Sealtite" flexible, liquid-tight conduit. Flexible conduit for lighting fixture connections shall be "Greenfield". Fittings shall be as manufactured by Appleton, Pyle-National or Thomas and Betts.

E. Watertight entrance seals for conduit shall be a 3 piece malleable iron casting set with a gland sealing assembly. Entrance seal shall be Type "FSK" as manufactured by O.Z. Electrical Manufacturing Company, Inc. or equal.

F. Type MC cable, 600V with copper circuit and ground conductors may be used where allowed by all applicable national and local codes. Cable shall be as manufactured by AFC, Coleman Cable, or Southwire.

G. No other conduit or cabling systems shall be used without prior submission to and approval by the Architect.

2.02 CONDUCTORS

A. All conductors shall be copper, with the exception of main feeders to main switchgear and feeders to panelboards located within the main electrical room on the ground floor only, which may be copper or aluminum, and shall conform to applicable A.S.T.M. Specifications as to conductivity. Stranding shall be I.P.C.E.A. Standard. Conductors No. 10 AWG and smaller shall be solid and all others stranded unless otherwise noted.

B. All conductors of sizes #10 AWG and larger shall have a moisture and heat resistant thermoplastic insulation. Underwriters' type THWN (75 degrees C. wet or dry). Wire shall be Anaconda "Densheath 900", G.E. "Flamenol", Simplex or equal.

C. Flexible drop cords shall consist of rubber insulated stranded conductors with an overall neoprene jacket, Underwriters' type S0 with integral ground wire. Cords shall be Simplex "Tirex", Okonite "Okocord", Anaconda "Securityflex" or equal.

D. Wires for lighting and receptacle circuits shall be color coded to indicate various phases and neutral. Color coding shall be consistent throughout the system and in accordance with Article 210.5 of the National Electrical Code. Color coding shall be by means of colored insulation material (preferred method), colored braid or jacket over the insulation, or by means of suitable colored, permanent, non-aging insulating tape applied to conductors at each outlet, cabinet, or junction point. The color coding shall be accomplished as the conductors are installed. The following systems of color coding shall be strictly adhered to:

PHASE	120/208 VOLTS
A	Black
B	Red
C	Blue
Neutral	White
Ground	Green

E. Type MC cable may be used where allowed by all applicable national and local codes.

F. No other conductors types may be used without prior submission to and approval by the Architect.

2.03 OUTLET BOXES, PULL BOXES AND JUNCTION BOXES

A. Ceiling Boxes
1. Ceiling outlet boxes shall be four-inch octagonal, 2-1/8" deep for exposed work or furred ceiling work, and three inches deep for concrete work. All boxes for the concrete work shall be of the type especially designed for this construction. Plaster rings and/or fixture studs shall be provided where required.
2. Ceiling outlet boxes for recessed lighting fixtures in lay-in ceilings and in accessible acoustical tile ceilings shall be four inches square, 1-3/4 inches deep.

B. Wall Boxes
1. Flush mounted types of boxes shall, in general, be suitable for the device housed and correspond to the type wall in which mounted. All boxes shall be provided with extension rings, covers and/or plaster rings with sufficient depth to bring the covers flush with the finished wall and to match the device mounted or the purpose intended.

2. Plaster walls shall utilize 4 inch square boxes or gang boxes, 1-1/2" deep with plaster ring for normal use and square cornered masonry boxes for through-wall use. Masonry boxes shall be similar to those specified for concrete block use.
3. Concrete block walls with flush outlets shall utilize square cornered, extra deep masonry boxes. Boxes shall be RACO No.S 570 through 578, Steel City No. GW-135 through GW-635, or Appleton Nos. M1-350 through M5-350.
4. Outlet boxes for exposed wall mounting and outdoor installation shall be cast metal "FS" or "FD" boxes. Exposed outlets in hazardous areas shall have boxes approved for that purpose by Underwriters'.
5. Where mullion switches are indicated, a narrow box suitable for mounting in the mullions should be used. Box shall be 1-5/16 inch wide by 1-5/8 inch deep by 3-3/4 inches high as manufactured by RACO, Steel City, or Appleton.

C. Pull boxes and junction boxes shall be code gauge sheet steel, sized according to the NEC with galvanized finish inside and outside. Covers for pull boxes and wiring gutters shall be secured with screws in an approved manner. Pull boxes and junction boxes where exposed to weather and moisture in wet or damp locations shall be galvanized weatherproof type with threaded hubs and gasketed covers.

D. Underground boxes (if any indicated or required) shall be Hope HD6000 galvanized cast iron, watertight submersible type, with wide flanges on box top, neoprene cover gasket, cover bolted on with stainless steel bolts, and threaded hubs for all conduit connections.

2.04 WIRING DEVICES

A. Wiring devices shall be one make, Underwriters' approved type as manufactured by Hubbell, Bryant, or Pass & Seymour. All devices shall be ivory except as otherwise directed by the Engineer.

B. Wall switches shall be installed on strike side of door.

C. Receptacles shall be installed at locations indicated on plan and as otherwise required and shall be equal to the following:

Duplex 20A, 125VBryant#5352I

Weatherproof, DuplexBryant#5352 w/#RB57520 ‘while in use’ cover

Floor, Duplex, SurfaceHubbell#B-2529 floor box w/SC-3091 fitting

Floor, Duplex, Flush Hubbell#B-2529/S-3925

Clock Outlet Bryant#2828GI

50A, 250V, 3-wire Hubbell #HBL 9367

30A, 250V, 3-wireBryant#9303I w/#9302-G plate

20A, 250V, 3-wireBryant#5461I

GFCI, 20A, 125V, Duplex, Bryant #GF 531I

D. Telephone outlets shall be installed at locations as indicated on plan and as otherwise directed by the Owner. Cover plates for boxes shall have single hole in center of adequate size for telephone cable to be installed.

E. Device Plates shall be installed plumb with all four edges in continuous contact with finished surfaces.

Interior (Flush) Bryant 72000 Series

Interior (Surface) Crouse-Hinds DS Series

Exterior (Receptacle) Bryant #4510

2.05 TIME SWITCHES

A. Time switches for contactor control shall be equal to Tork #K800Z. Time switches for individual circuit control shall be Tork #DWZ100A with astronomic dial and reserve power feature. Time switches for fan motor control shall be Tork #DW200A. Provide surface or flush cabinets as indicated on the plans.

PART 3 - EXECUTION

3.01 PHYSICAL PROTECTION OF WIRING

A. All wiring systems shall be installed in conduit unless specifically indicated otherwise in these specifications or on the drawings.

B. Conduit Systems:

1. Conduit systems shall be continuous and shall be rigid steel, intermediate metal, electrical metallic tubing (E.M.T.), rigid aluminum, non-metallic fiber or polyvinylchloride (PVC) plastic as specified herein or as indicated on plan. Electrical nonmetallic tubing (ENT) is NOT permitted on this project.
2. Rigid steel conduit shall be used for installation in earth, concrete slabs on grade, where exposed to the weather and other areas as indicated on plans. All joints shall be made with standard conduit couplings or unions. Running threads will not be permitted. Conduit shall be reamed after cutting. Newly cut conduit threads shall be protected from rusting by coating with graphite grease or other rust resisting, non-insulating compound. Double lock nuts shall be used at terminations.
3. Electrical metallic tubing and intermediate metal conduit may be used for both exposed and concealed wiring in dry locations and where not subjected to mechanical damage. Electrical metallic tubing shall not be installed in concrete slabs on grade. Electrical metallic tubing shall not be used in sizes larger than 2 inch nominal diameter.
4. Type MC cable may be used for concealed work as allowed by all applicable national and local codes.
4. Aluminum conduit may be used in dry locations for exposed or concealed work. Minimum size 2-1/2 inch nominal diameter. In no case, shall aluminum conduit or fittings be installed in concrete, earth or in damp or corrosive atmosphere.
5. Non-metallic fiber or type EB, PVC plastic ducts may be used for underground sections of feeders and service conduits unless otherwise indicated on the drawings. Ducts shall be encased in a 3 inch minimum thickness concrete envelope for mechanical protection. The joints of the ducts shall be assembled together with approved couplings to make a watertight joint. Approved type grade blocks, 2 per section of duct, shall be provided. Care shall be taken to securely anchor conduit in place in order to prevent displacement of the conduit during pouring and puddling operation. Risers from underground ducts shall consist of galvanized rigid steel long radius elbows and conduit. Provide grounding conductor for entire length of non-metallic conduit and bond to rigid steel terminal conduit at each end to provide a continuous ground system. Ground wire shall be installed inside of duct and shall be sized as required by NEC.

6. Schedule 40, heavy wall, PVC plastic conduit may be used in all areas of the project where allowed by local authority having jurisdiction and subject to the following:
    a. Exposed conduit shall not be installed within 8 feet of floor or where subject to damage.
    b. Conduit shall not be installed where exposed to weather or extreme temperature variations.
    c. Conduit must be protected by 3 inch concrete envelope where used underground outside the building.
    d. Plastic conduit shall be prepared, installed, and all joints cement welded in strict accordance with manufacturer's recommendations as described in Carlon publication No. TC2.
    e. Install a rigid galvanized steel conduit elbow at the base of each riser from each underground and underfloor non-metallic conduit above ground and above floor, coupled in the non-metallic conduit with the proper non-metallic to metallic fitting.
    f. Install a ground wire in each plastic conduit. Wire shall be sized in accordance with the NEC.
7. Expansion fittings shall be provided in all conduits at building expansion joints.
8. Conduit shall be securely supported, strapped or otherwise attached to the building structure at intervals of not more than 5 feet for sizes up to and including 1 inch, at intervals of not more than 8 feet for large sizes. In concrete slab construc-tion, conduit shall be supported with at least three wraps of No. 12 gauge iron wire twisted to support every five feet or less.
9. In all finished areas, conceal all conduits below floors, within slabs, within walls, above suspended ceilings, or within other building construction, unless indicated or specified otherwise.
10. Conduits shall be exposed where indicated, and may be exposed in mechanical equipment rooms, at electrical distribution centers, in unfinished areas, and where directed by the Engineer. Exposed runs shall be installed in neat symmetrical lines parallel to or at right angles to the building lines.
11. All runs shall be installed to avoid piping and ducts of the mechanical equipment systems, providing at least 3 inches separa-tion from steam or hot water pipes.
12. Conduits terminating at motors, valves or vibration producing equipment shall be connected to the equipment by means of flexible conduit not to exceed 3 feet in length.
13. Install a 200 pound test nylon pull line in all empty conduits.

3.02 CONDUCTOR INSTALLATION

A. Splices, taps, attachment fittings and lugs shall be electri-cally and mechanically secure and shall use solderless lugs and connectors. There shall be sufficient slack cable in boxes, outlets and cabinets to insure that there is no binding at the bushings. All lugs shall be of the correct sizes for the conductors joined and in no case shall strands be cut from a conductor in order to fit the conductor into a lug. Taping of joints shall be either with Scotch electrical tape, rubber tape and friction tape or varnish Cambric tape and friction tape to secure insulation strength equal to that of the conductors joined. Splices or joints with friction tape outer covering in conductors of size No. 4 AWG or larger shall have three (3) coats of suitable insulation varnish paint applied over the tape.

B. Wire sizes shall be as follows unless indicated otherwise:
    1. Branch circuit wire----------No. 12 AWG
    2. Control wire----------No. 14 AWG
    3. Special system wire----------As recommended by the manufacturer of the equipment involved.
    4. Where the distance between the panelboard and the first outlet in a branch circuit is more than 60 feet, No. 10 AWG wire or larger shall be used.

3.03 OUTLET BOXES, PULL BOXES AND JUNCTION BOXES

A. Boxes shall be sized in accordance with the NEC and in no case be smaller than necessary to adequately receive the equipment for which it was intended. Outlet, switch, and other flush mounted boxes shall be set with the outer edge flush with finished surface. Provide watertight gasketing under box covers for all boxes exposed to the weather.

B. Boxes for floor mounted outlets shall be set flush with finished floor level. Provide carpet flange where carpet is used.

C. Boxes for convenience outlets and telephone outlets shall be installed 18 inches above the floor and wall switches 48 inches, except as otherwise noted. For block or brick wall construction, the height of the boxes may be adjusted to fit the block or brick coursing if approved by the Engineer.

D. All boxes shall be rigidly mounted and shall be equipped with suitable screw fastened covers. Open knockouts or holes in boxes shall be plugged with suitable blanking devices.

3.04 MOTORS

A. All motors shown furnished in place under other sections of these specifications shall be wired under this section. All motors shall be wired complete including starting switches, disconnect switches, etc. Motor sizes indicated are approximate only and are subject to change to suit standard motor drives of various manufacturers. The full load current and starting characteristics of each motor shall be verified for proper selection of motor overload devices.

B. Furnish and install all steel shapes. etc., necessary for the support of all motor controllers and pushbutton stations.

3.05 POWER AND CONTROL WIRING

A. Provide all power and control wiring, electrical outlets and connections as indicated on the drawings or as required for the proper operation of all electrically operated equipment furnished to this project under this contract or by the Owner. Carefully examine architectural, plumbing and heating, air conditioning drawings, and specifications for items which may require electrical connections. Unless items are specifically indicated to be contrary, provide conduits, condulets, junction and outlet boxes, panelboard circuits, disconnecting switches, wire, fittings, and other electrical items, and make final connections to items of equipment furnished by others for proper functioning of equipment and systems. Where voltage characteristics differ, provide proper breakers, switching, or transformers to connect equipment to its rated voltage. Locate outlets for and make connections to conform with manufacturer's rough-in drawings, and for efficient and convenient use of apparatus connected. No exposed or open wiring will be permitted in finished area.

B. Wiring for control systems shall be installed in accordance with approved wiring diagrams furnished on shop drawings under the section in which the equipment involved is specified.

C. Provide empty conduit system and receptacles for telephone equipment per requirements of telephone equipment supplier. Conductor installation shall be by telephone vendor.

D. Certain detached electrical control devices such as motor controllers, wall thermostats, control transformers, relays, etc., will be furnished under other divisions for installation and connection under this division of the specifications.

E. Furnish and install all disconnect switches as required.

3.06 GROUNDING

A. The interior electrical systems shall be completely and effectively grounded as required by the NEC, Article 250.

B. All ground connections, where buried or otherwise inaccessible, shall be brazed or welded.

C. Ground wire shall be included with feeder to respective electrical panels from switchboard. Ground wire shall also be included in feeder to each motor control center or distribution panel.

D. All metallic raceways shall be mechanically and electrically secure at all joints and at all boxes, cabinets, fittings and equipment. Metallic raceways shall be connected to a direct ground at the point of electrical service entrance and shall be electrically continuous throughout the entire system.

E. Provide ground wire in all non-metallic conduits and all conduits with set screw or die cast fittings.

F. Motors shall be connected to the conduit system by a section of flexible conduit with integral ground wire.

3.07 FEEDER, SWITCH AND DEVICE RATINGS

A. The sizes of feeders, motor starters, switches, protective devices, and other devices indicated on the electrical drawings for electrically operated equipment are based on the average current or horsepower ratings of electrically operated equipment of the same general types and sizes upon which the designs of the air conditioning, plumbing, electrical and other systems are based. Horsepower ratings indicated on the drawings are for guidance only, and shall not limit the size of the equipment or feeders. Check the current and horsepower ratings of all electrically operated equipment actually furnished and installed, and adjust the sizes of all feeders, starters, switches, protective devices, and other devices as required to provide for proper protection and satisfactory operation of the equipment actually installed.

B. This includes increasing to the next larger size, or decreasing to the next smaller size, any individual feeder, starter, switch, breaker, or other device, to match the equipment sizes actually installed, as required, except that no sizes shall be decreased without approval in writing from the Engineer.

C. Where starters, switches, protective devices, and other devices are specified in other sections of these specifications, check the rating of each device with the current or horsepower rating of the corresponding electrically operated equipment which is actually installed, before installing and/or connecting any such device. Do not install and/or connect any device that is found to be the incorrect size.

3.08 HANGERS, SUPPORTS AND SLEEVES

A. Securely attach all hangers, supports, and devices to the building structure with approved anchors as applicable to the types of building construction involved. Provide all necessary angle iron, pipe, "Kindorf", "Unistrut", and other approved auxiliary supports for the electrical work.

B. Hangers or supports for conduits and raceways shall be approved standard conduit or raceway straps or other approved clamping devices. Trapeze hangers may be used for groups of suspended horizontal conduits, with each conduit clamped to each trapeze bar. Perforated strap iron hangers will not be permitted.

C. Maximum hanger or support spacings for all conduits shall be as required by the codes. Support all non-concrete encased underground conduits by laying with full length bearing on firm trench bottoms. Support each riser conduit at each building floor level.

D. Adequately support all boxes, gutters, panelboards, switches, starters, fixtures, and other devices and equipment as required by the codes, and as indicated.

E. Provide sleeves for all conduits and other electrical items passing through concrete or masonry construction, where these items are not installed prior to concrete pouring or masonry laying. All sleeves through concrete walls, concrete columns, and concrete beams shall be IPS steel pipe or rigid steel conduit, flush with finish concrete surfaces. All sleeves for all exposed conduits passing through floors (except slabs on ground) where water on floor can pass through the opening shall be galvanized IPS pipe or galvanized rigid steel conduit extending 2 inches above finished floor, and flush with slab below. All other sleeves may be sheet metal.

3.09 EXCAVATION AND BACKFILL

A. Perform all excavation and backfilling required for work under this division of the specifications, including necessary sheathing and bracing. Trench bottoms shall be graded true and free from stones or soft spots.

B. Use of excavated material for backfill will be acceptable only when free of stones, cinders or other materials which may be a hazard to installed materials. Provide a minimum 6 inch sand (or other approved material) fill over and around the installed material where excavated material is deemed unsuitable by the Engineer. Tamp and compact backfill to insure against differential settling.

C. Dispose of all surplus backfill material in a manner approved by the Owner's designated representative.

END OF SECTION

SECTION 16220

EMERGENCY GENERATOR SYSTEM AND TRANSFER SWITCHES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Materials, equipment, fabrication, testing and installation for a complete and operable Diesel Emergency Generating System for fire pump, including all devices and equipment specified herein, shown on the drawings and installed in conformance with the applicable codes and authorities having jurisdiction and shall include, but not limited to, the following:
   a. Diesel engine-generator sets rated as indicated on the drawings.
   b. Engine-generator controls and distribution panels as outlined.
   c. Transfer switch and accessories as specified.
   d. All necessary control devices to provide a complete, operable system, along with all auxiliary equipment as specified and/or shown on drawings.

B. The power system consisting of prime movers, generators, transfer switches and all controls necessary to operate prime movers, generators and transfer switches, must be tested as a system on a representative engineering prototype model. The prototype prime movers shall be tested with all prime mover accessories specified in place and operating. These accessories include but are not limited to: battery charging alternator, water pump, radiator and fan, oil pump, fuel pump, fuel and air filters and exhaust muffler.

C. The performance tests of the generating set series shall be in accordance with procedures certified by an independent testing laboratory. The manufacturer shall have successfully tested a prototype of the generating set series offered. These tests shall have included:

1. Maximum power level.
2. Maximum motor starting capacity.
3. Structural soundness.
4. Torsigraph analysis per MIL-STD-705B, Method 504.2.
5. Fuel consumption.
6. Engine-alternator cooling air flow.
7. Transient response and steady state governing.
8. Alternator temperature rise per NEMA MGI-1.65 and BS2757.
9. Single step load pickup per NFPA 110.
10. Harmonic analysis and voltage waveform deviation per MIL-STD-705B, Method 601.4.
11. Three phase short circuit test for mechanical and electrical strength. Additional details of performing certain of these prototype tests are described herein.

D. The manufacturer shall maintain a similar system in full operating condition at all times at his place of business for a period of at least two-years after shipment. This system shall be available for simulation and diagnostic purposes.

E. Warranty: The complete standby electric power system shall be warranted for a period of 5-years or fifteen hundred (1500) operating hours, whichever occurs first, from the date of initial start-up. Multiple warranties for individual components (engine, alternator, controls, etc.) will not be acceptable. Satisfactory warranty documents must be provided. This warranty shall be for complete parts and labor, for the automatic transfer switches as well as the engine-generator sets for the above period of time.

F. The emergency system described herein, including the engine-generator set, engine auxiliary and engine-generator control panel, and transfer switch shall be furnished by a single supplier who is regularly engaged in the production of diesel fueled control products. The responsibility for performance to this specification in its entirety cannot be split up among individual suppliers of components comprising the system, but must be assumed solely by the supplier of the system. A single manufacturer shall furnish schematic and wiring diagrams for the emergency generating sets, and an interconnection wiring diagram showing all connections to each individual piece of equipment which constitutes the emergency power system. The manufacturer shall have printed literature and brochures describing the standard series specified (not a one of a kind fabrication).

G. The emergency system described herein including engine-generator sets, engine auxiliaries, engine-generator control panels, transfer switch, etc. is designed around Caterpillar/Olympian, or approved equal, and all equipment furnished shall be as approved equal in every way to that specified herein, including quality, operation and function.

1.02 RELATED WORK AND REQUIREMENTS

A. Requirements of GENERAL CONDITIONS and DIVISION 1 apply to all work of this section.

B. Related Work:
1. Section 16100 - Basic Electrical Materials and Methods

1.03 REFERENCE STANDARDS

A. Published specifications, standards, tests or recommended methods of trades, industry or government organizations apply to work in this section where cited below:
1. ANSI - American National Standard Institute
2. DEMA - Diesel Engine Manufacturers Association
3. IEEE - Institute of Electrical and Electronic Engineers
4. NEMA - National Electrical Manufacturers Association
5. NFPA - National Fire Protection Association
6. UL - Underwriters Laboratories, Inc.
7. State of Florida Generator Requirements

1.04 QUALITY ASSURANCE

A. All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacturer.

B. Supply all equipment and accessories new, free from defects and listed by Underwriters Laboratories, Inc. and bearing its label.

C. Supply all equipment and accessories in compliance with the applicable standards herebefore listed in this section and with all applicable national, state and local codes.

D. All items of a given type to be the products of the same manufacturer.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Ship equipment in its original package to prevent damaging or entrance of foreign matter. All handling performed in accordance with manufacturer's recommendations. Provide protective coverings during construction.

B. Replace at no expense to Owner, equipment or material damaged during storage or installation as directed by the Architect.

PART 2 PRODUCTS

2.01 RATING

A. The diesel engine driven generator set, by Cummins/Onan 150DGFA, or approved equal, shall be rated for continuous standby duty for the duration of a utility power failure at 150kW, 187.5kVA at 0.8 PF, 60 Hz, 1800 RPM. 120/208Volts ac., 3 Phase, 4 wire system, or as required by the fire pump to be installed and elevator manufacturer. The sizing indicated herein is estimated based upon initial fire pump requirements, and includes the largest elevator. A manual transfer switch is indicated for backup in the event of failure of the primary elevator during a power failure.

B. The rating of the generator set is specified as the available output after all engine/generator driven auxiliary equipment losses are subtracted from the engine/generator gross power. These losses include but are not limited to the engine cooling fan, fuel lift pump, battery charging alternator, muffler backpressure losses and a.c. generator efficiency. The specified rated output allows for any derating of the engine/generator set due to site conditions of 86°F maximum ambient temperature, and 500 feet altitude above sea level.

2.02 ENGINE

A. The diesel engine shall be designed specifically for generator set use. The engine block shall be of cast iron complete with plateau honed replaceable cylinder liners, and be constructed for heavy-duty industrial use. Design shall be 4 cylinder, four cycle having a minimum displacement of cubic inches with a straight in-line or Vee configuration. The engine aspiration is turbo-charged. The fuel injection pump as specified by the engine manufacturer, shall be driven directly by the engine through an interlocking gear system as an integral part of the engine assembly. A heavy dynamically balanced flywheel suitable for constant speed generator duty is to be included in the engine assembly.

B. The engine shall be equipped with the following:
   1. Engine Speed Governor: A mechanical governor shall be fitted on the engine-generator set assembly to provide a no-load to full load frequency regulation of ±3%.
   2. Starting Motor: A d.c. electric negative ground starter motor complete with an electro-mechanical positive shift engagement mechanism, capable of repeated cranking cycles without overheating is attached directly to the engine flywheel housing.
   3. Battery: Shall be of the limited maintenance type, able to withstand minimum charging rate of a battery charger and able to make 3 consecutive starts. Battery shall have sufficient capacity for cranking for at least 30 seconds at firing speed at 0°F ambient temperature. Battery cables shall be of ample size not to

overheat for all cranking modes and shall be manufactured of copper with means to retard corrosion at the battery terminals.

4. Battery Charging Alternator: A 55 ampere automatic battery charging alternator with a solid state voltage regulator is to be engine mounted. The battery charging alternator shall be belt driven by the engine.
5. Cranking Cycler: Shall control the starter cranking period. The cycler shall provide for protection of overcranking, if the engine fails to start. An indicator on the Control Panel will show when in the overcrank mode.
6. Fuel Pump: Self-lubricating engine driven, mechanical, positive displacement fuel lift pump. Fuel filters shall be mounted on the engine in such a location as to provide easy access for inspection and maintenance.
7. Oil System: The engine shall be complete with a direct gear driven self lubricating oil pump for supplying lubrication oil under pressure within the parameters as specified by the engine manufacturer. Full flow replaceable lubrication oil filters of the spin-on canister element type shall be fitted directly to the engine in a suitable position to ensure easy replacement. The filter system shall be equipped with a spring-loaded bypass valve to ensure oil circulation in the event of the filter elements becoming clogged.
8. Oil Dipstick: A lubricating oil dipstick shall be provided and located conveniently for testing without undressing the engine housing or difficult reaches. The generator set engine shall be filled with the correct lubricating oil.
9. Air Filters: Air filters shall be replaceable dry cartridge type of sufficient size for the quantity of aspiration air. The filter shall be mounted in a convenient place for maintenance. Air intake vacuum indicator shall be provided which will indicate when filter element is in need of servicing.
    a. Air filter element shall be mounted in steel enclosure. Unitized plastic style cleaner/housing assemblies are not acceptable.

2.03 EXHAUST MUFFLER

A. Exhaust silencer shall be residential grade and shall be provided with a flexible steel connection on the engine exhaust outlet.

2.04 COOLING SYSTEM

A. Radiator: The engine/generator assembly shall be liquid cooled by a vertically mounted, tropical capacity radiator system for cooling the machine at rated ambient temperatures at full rated continuous standby load.

B. The radiator core and fin design shall take into account compensation for possible ingress of dirt, which would normally clog the fins. The diesel engine itself shall be equipped with a radiator blower fan. This fan and all associated moving parts between the engine and radiator shall be encased in a safety guard constructed to prevent any contact with moving parts while the generating set is in operation. The radiator and fan design shall be capable of cooling the engine in the specified ambient temperature and also allow for an external static pressure drop of 0.5 inches of water column.

C. To ensure a rapid temperature rise from initial start, the engine shall be fitted with an integral thermostatically controlled valve designed to automatically operate between the minimum and maximum engine operating temperature range as specified by the engine manufacturer. A coolant-circulating pump shall be fitted and driven directly by the engine fan belt arrangement.

D. All hose connections shall be amply attached to the tanks and connected to the engine with reinforced high quality hoses. Hoses shall be for standby duty and will stay pliable

after long exposure to heat and idleness. Airplane type worm drive clamps shall be used to attach all coolant hoses to the engine and radiator.

E. Water Heater: A 120 volt a.c., 60 Hz electrically powered jacket water heater of 1000 watts shall be fitted to the engine/generator assembly to maintain the engine coolant at a temperature recommended by the engine manufacturer while the standby generating system is stationary. The heater shall be inoperative when the generator engine is operating.

F. The engines shall be fitted with a sensor designed to close a contact when the coolant within the engine block falls below a temperature of 70°F. Upon closure of the contact an alarm indicator on the control panel shall be illuminated.

G. The radiator shall be fitted with a sensor to detect a low coolant level and illuminate an alarm indicator on the control panel while activating a generator set shutdown and lockout.

2.05 FUEL OIL SYSTEM

A. Fuel Oil Tank: The fuel oil base tank shall be UL listed and comply with the requirements of NFPA 30. Tank shall comply with EPA requirements. Tank capacity shall be adequate to supply engine generator at full rated load for a minimum of eight (8) hours. The skid mounted base tank shall be complete with:

1. Contents indicator
2. Venting arrangement
3. Drain plug
4. Filler cap
5. Fuel feed and return lines to engine
6. Fuel containment basin, with leak detection switch of capacity at least equal to 110% of tank capacity per NFPA requirements, or as required by Florida state code. Upon leak detection, an alarm indicator shall be illuminated on the control panel.

Tank shall be manufactured by Simplex, Inc. or approved equal.

B. Low Fuel Indicator: The fuel system shall be fitted with a sensor to detect low fuel level and illuminate an alarm indicator on the control panel, while activating a generator set shut down and lockout.

C. Fuel Type: The fuel system shall be No. 2 diesel fuel.

2.06 MOUNTING ARRANGEMENT

A. Baseframe: The engine, generator and cooling radiator shall be mounted as a whole on a common, heavy duty, fabricated steel baseframe constructed from folded channel sections.

B. The common skid frame shall be complete with crane lifting arrangement to allow for maneuvering of the generator system. This shall allow for placing of the complete generator set on a suitable foundation or surface.

C. Vibration Isolators: Shall be positioned between the coupled engine/alternator and the skid frame to prevent transmission of the engine generator vibration to the surrounding area while the generator is in operation. The baseframe shall provide a suitable battery mounting rack and clamp within the area of the base.

2.07 GENERATOR

A. The a.c. generator shall be: Brushless, synchronous, four pole, 12-lead reconnectable, drip proof construction to NEMA I standby, and air-cooled by a direct drive centrifugal blower fan.

B. The generator shall have a single prelubricated, maintenance free bearing and be directly connected to the engine flywheel with a semi-flexible coupling attached to the generator rotor assembly, which will be dynamically balanced.

C. Leads shall be brought out to fixed termination points located within the generator terminal box to provide a convenient cabling area.

D. Winding insulation shall conform to Class H standards as defined by NEMA MGI-22, with 100% rated load temperature rise not to exceed the Class H specified limitation of 257°F. All windings shall be coated with epoxy resin to be fungus resistant.

E. The generator starter shall be wound to a 2/3 pitch to eliminate triple harmonics and avoid excessive neutral currents.

F. The rotor shall have amortissuer (damper), winding, layer wound of mechanically wedged winding construction.

G. The brushless exciter rotor output shall feed the main rotor through a three-phase full wave silicon diode solid state bridge rectifier incorporating a surge suppressor in parallel with the field winding.

H. Wave form distortion (THD) at no-load shall be less than 1.8%: THD< 1.8%. Telephone interference factor shall be less than 50: THF < 50.

I. The excitation system shall be controlled by a solid state design, automatic voltage regulator. The regulator shall control build up of generator voltage to provide a linear rise using a closed loop design to maintain an output voltage regulation of ±1% of nominal voltage from no-load to full rated load, regardless of variations in temperature and power factor of the generator.

J. A frequency measuring circuit is to be included as an integral part of the regulator to provide under frequency protection by reducing the generator output voltage in proportion to speed below a presettable threshold (to be manually adjustable).

K. Factory set to the manufacturers recommendation.

L. The AVR shall be mounted in the generator terminal box on isolators to minimize vibration.

2.08 GENERATOR CONTROL PANEL

A. The control panel shall be constructed of heavy gauge sheet steel with a side hinged, lockable door. To prevent corrosion all metallic surfaces both external and internal shall be zinc phosphated and chromated prior to painting with polyester powder cured at 400°F.

B. All panel fascia shall be engraved laminated plastic fixed to the control panel by mechanical means. Printed fascias bonded to the panel by adhesive are not acceptable.

C. The control panel shall be mounted on the engine/generator set by means of a vibration isolated, robust steel stand corrosion treated as per the control cubicle. Control cubicles mounted directly above the generator or built into the generator a.c. output connection box are not acceptable.

D. All engine and generator wiring harnesses shall be contained within flexible, fluid resistant conduit. Separate wiring harnesses for d.c. and a.c. voltage shall be affixed to the engine/generator assembly by secure mechanical means.

E. Engine/generator wiring shall terminate at the control panel using a plug and socket arrangement, mechanically held in place, to allow for ease of maintenance.

F. Control logic shall be in the form of an integrated printed circuit board directly connected to control wiring by a plug and socket arrangement to facilitate ease of replacement.

G. The following a.c. instrumentation, engine gauges, controls and annunciation shall be included:

1. INSTRUMENTS
   - AC voltmeter
   - AC ammeter
   - Combined a.c. frequency & tachometer
   - Running time meter
   - Engine coolant temperature gauge
   - Engine lube oil pressure gauge
   - Starting battery voltmeter
2. CONTROLS
   - Integrated printed circuit board controller
   - Run/off/automatic selector switch
   - Emergency stop push-button (red mushroom)
   - Lamp test/reset button
   - 7 position voltmeter phase selector switch
   - 4 position ammeter phase selector switch
   - 3-attempt cycle crank autostart module
   - 2-wire automatic start/stop operation terminals
   - Terminals for remote emergency stop
3. SAFETY SHUTDOWNS WITH INDIVIDUAL INDICATOR LAMPS
   - Fail to start (over crank)
   - High coolant temperature
   - Low engine oil pressure
   - Overspeed
   - Low coolant level
   - Low fuel level
4. ALARMS WITH INDIVIDUAL INDICATOR LAMPS
   - Approaching high coolant temperature
   - Approaching low oil pressure
   - Low battery voltage
   - Battery charger fail
   - Control switch "not in automatic"
   - Low coolant temperature - alarm only.
   - Low fuel level - approximately 3 hours remaining - alarm only

H. Remote signals for annunciator: All indicator lamps listed above shall be duplicated on a remote annunciator, in addition to a "generator running" indicator.

I. Generator Output Circuit Breaker: The generator output circuit breaker shall be provided in a separate individual enclosure to the same paint specification as the control panel, mounted adjacent to control panel on the steel support framework. This is to provide easy access to the circuit breaker for stub-up connecting points.

1. The circuit breaker shall be molded case type, Westinghouse C Series or equal, sized as per drawings.

2.09 GENERATOR SET ENCLOSURE (SOUND ATTENUATION)

A. The generator shall be provided with an outdoor weather protective lockable enclosure with the following minimum quality details of construction. The enclosure shall be sound attenuated not to exceed 73 dBA at 23 feet at full load.

B. The enclosure shall be of steel construction zinc phosphated and chromated before being electrostatically coated with a high durability polyester powder cured at 400°F.

C. The enclosure shall be designed for access to control panel and output power circuit breaker without penetrating any part of the enclosure itself. The stub-up location for both power and control circuits shall be planned for bottom entry.

D. The enclosure shall include two access doors on each side of the generator unit for maintenance, control and breaker access. This door will include a viewing window to allow visual reading of the control panel while it is closed.

E. All hardware, hinges, latches and fasteners, which are exposed to the exterior, shall be stainless steel.

2.10 AUTOMATIC TRANSFER SWITCHES

A. The automatic transfer switch for the fire pump shall be as designated on the Drawings or as required by final requirements of the actual fire pump to be installed. A combination ATS/Fire Pump Controller may be used, given that is rated as suitable for use as a service entrance, and is also rated for fire pump service. The automatic transfer switches for the elevator, lighting, and computer panels shall as designated on the Drawings, as required by final requirements of the actual elevator to be installed. The transfer switch shall be electrically operated, mechanically held using a motor mechanism and shall be listed per UL Standard #1008 as a recognized component for emergency systems and rated for all classes of loads when installed in an unventilated enclosure. All main contacts shall be visible from the front, close differential voltage sensing on all phases of normal source. Pick-tip voltage adjustable from 85% to 100% of nominal, dropout at 85% unless otherwise specified. Voltage sensing of emergency shall be adjustable from 95% to 100% on nominal. Factory set to pick-up 90%. Frequency sensing of emergency shall be adjustable from 90% to 100%. Factory set to pick-up 95% unless otherwise specified. A control module shall include the following features:

1. Time delay to override momentary normal source outage to delay transfer on engine starting, adjustable from 0.5 to 6.0 seconds. Factory set at 1.0 second unless specified otherwise.
2. Additional transfer to emergency time delay adjustable from 0 to 5.0 minutes for control timing of load transfer to emergency. Factory set 0 unless specified otherwise.

3. Re-transfer to normal adjustable time delay from 0 to 30 minutes with automatic bypass if emergency source fails. Set at 30 minutes unless otherwise specified. Engine control contacts for low voltage engine start signals, 1 normally open and 1 normally closed. Test switch to simulate power failure. Pilot lights for indication of transfer position (Normal and Emergency). Auxiliary pilot contact; one closed on normal and one closed on emergency.
4. Additionally, the transfer switch for the elevator shall be equipped with a pre-transfer switch.

2.11 MANUAL TRANSFER SWITCH

A. The manual transfer switch shall be 300 amp, 3 pole, NEMA 1 enclosed three phase, or as required by final requirements of the largest elevator to be installed.

PART 3 EXECUTION

3.01 INSTRUCTION OF OWNER'S PERSONNEL

A. A complete set of Operation and Maintenance Manuals shall be supplied at project close out.

B. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in the operation, adjustment and maintenance of all products, equipment and system, after all the on-site tests have been accomplished. This instruction shall include a minimum of two (2) hours on-site instruction.

C. Operating and maintenance manuals shall constitute the basis of instruction.

D. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

3.02 SPARE PARTS

A. Spare parts shall be delivered to the Owner with the generator set before final acceptance of work.

B. The following list of spare parts shall be furnished with the generator set and packaged in sets or pieces (except for glycol) with part description and numbers:
1. Fuses - One complete set for each set installed
2. Fuel Filters - One complete set
3. Oil Filters - One complete set
4. Air Filters - One complete set
5. Ethylene Glycol - 2 one-gallon containers
6. Lubricating Oil - One complete change in quart containers
7. Fan Belt
8. Alternator Belt
9. Water Pump Belt

3.03 CERTIFIED TEST REPORTS

A. The contractor shall provide, prior to shipment, certified test reports of the assembled unit for review by the customer. Normal preliminary engine and generator tests shall have been performed before unit is assembled.

3.04 DESIGN PERFORMANCE TEST

A. The contractor shall arrange with the supplier to complete design performance testing of the generator at the job site after all installation is complete. Unit shall be performance tested under full load using an artificial load bank for a minimum of 2-hours.

END OF SECTION

SECTION 16400

SERVICE AND DISTRIBUTION

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. The General Conditions, Instructions to Bidders, and all other general requirements of these specifications shall be considered a component part of this division of the specifications.

B. Bidders to this section shall review all other sections of these specifications. All items in other sections relating to this section are as binding on this bidder as if repeated herein.

1.02 SCOPE

A. This section covers the specification of the service and distribution equipment for this project. Attention is directed to all other sections of this division of the specifications.

B. All panelboards, circuit breakers, and main switchboard shall be the products of one manufacturer. Acceptable manufacturers for this equipment shall be: Square “D”, Eaton, Siemens, or General Electric.

PART 2 - PRODUCTS

2.1 TIME SWITCHES AND PHOTOELECTRIC CONTROL

A. Time switches for contactor control shall be equal to Tork #K800Z. Time switches for individual circuit control shall be Tork #DWZ100A series with astronomic dial and reserve power feature. Provide surface or flush cabinets as indicated on the plans. Photoelectric controls shall be equal to Tork Model 2001 for 120 volt controls and Model 2002 for 208/277 volt controls.

2.02 CONTACTORS

A. Contactors for the time controlled circuits shall be mechanically held-magnetically operated. The contactors shall be rated for 600 volt service on 60 hertz alternating current. The size of the contacts and the number of poles shall be as indicated on the drawings. Contactors shall be as manufactured by ASCO, Square D, or Westinghouse.

2.03 MAIN SWITCHBOARD

A. Furnish and install main switchboard as shown and as specified herein. The switchboards shall be built to form a continuous metal enclosed structure suitable for interior installation and shall be shipped in one or more completely assembled sections, the size of sections depending upon handling facilities at the destination, or as directed. Switchboards shall be completely assembled, wired, adjusted, and tested at the factory under ASA Standards to assure the ability and functions of the equipment. Switchboards shall be furnished with UL label for service entrance duty. Switchboards shall be built for front access only.

B. Submit shop drawings for approval. The drawings shall include the following:
   1. Exterior views.
   2. Floor plan including dimensional data to allow accurate placement of floor opening for service entrance cables.
   3. Necessary side views and section views.
   4. Elementary diagrams.
   5. Appropriate diagrams of metering.
   6. Appropriate diagrams of ground fault protection.
   7. Bill of materials.
   8. Nameplate data.
   9. Electrical characteristics and pertinent data on all components.

The assembly and all component parts shall be the latest standard design of an approved manufacturer or manufacturers with only such modifications as may be specifically called for herein. All component parts of the same type and rating shall be interchangeable, shall be of the same manufacture, and shall be consistent mechanically and electrically with the rating of the assembly as a whole.

A. Switchboard shall be constructed in accordance with the latest NEMA PB-2 and UL 891 Standards.

B. Coordinate and install a 6" high concrete base for the switchboard. If steel foundation members are required in the concrete base, they shall be furnished and installed in accordance with the shop drawings. Thoroughly check the equipment before placing it in service and make all necessary field adjustments. All external connections to the equipment shall be fully coordinated with the equipment manufacturer

C. Assembly:
   1. The overall housing shall consist of completely enclosed, freestanding, floor mounted, dead front units with front and back aligning for full length. The manufacturer's standard arrangement of equipment and compartments will be acceptable providing all equipment is easily accessible for maintenance from the front. The housing shall be constructed of formed sheet steel and structural steel with multiple, metal-enclosed, ventilated sections. The design shall incorporate preformed steel channels, angles, and side sheets bolted together and reinforced to form a rigid, self-supporting, compact assembly.
   2. All steelwork, after fabrication, shall be cleaned and given a rust resisting primary coat of paint. The entire structure, inside and out, shall be finished with a fast drying enamel dark grey.
   3. A full set of engraved nameplates shall be furnished on the switchboard to identify each unit. Nameplates shall identify items as indicated on the Drawings.

A. Bus:
   1. Main bus shall be 3 phase, 4 wire copper with welded connection joints or copper with silver plated connection points. The bussing shall be of sufficient cross-sectional area to maintain 65°C temperature rise maximum. Neutral bus rating shall be 100% of the main bus current rating and shall be located centrally in the structure for ease of terminating cables whether entering from above or below. 600-volt clearances shall be maintained in all horizontal and vertical busses such that insulation is not required.
   2. Bus bracing shall be adequate for 50,000 amperes short circuit current. A 1/4" by 3' copper ground bus will be provided with ground lugs for all required conductors.
   3. Provide a non-insulated ground bus in all sections of switchboard.
   4. Lugs of proper size and rating shall be provided on all buses.

A. The entire assembly shall be a front-connected, NEMA Class switchboard rated for service entrance duty, as manufactured by Square “D’, Eaton, Siemens, or General Electric.

B. Finish:

1. During construction, the structural steel parts, panels, and compartments shall be prepared for painting by phosphatizing and then finished with a paint color of ANSI 61 light gray.

2.03 PANELBOARDS

A. Panelboard shall be totally enclosed, dead front, bolted circuit breaker types with hinged doors, lock and keys and as otherwise specified in the Panelboard Schedule or on the drawings.

B. Panelboards shall have distributed phase bussing throughout so that any two adjacent single pole breakers can be replaced by a two-pole breaker. Bus structure "lug" location shall be determined by field prior to ordering.

C. Cabinets shall provide adequate gutter space and shall be constructed of code gauge steel.

D. Trims shall be constructed of one piece, full finished sheet steel with door cut out. Hinges and trim fasteners shall be concealed. Locks shall be keyed alike.

E. Directory frames with card and plastic front shall be provided inside each door.

F. "Load Center" type panelboards will not be considered an acceptable substitute for the material described in this section except when specifically so indicated on the drawings.

2.04 CIRCUIT BREAKERS

A. Circuit breakers for panelboards shall be approved for switching, quick-make, quick-break, with center trip indicating handles. The circuit breaker mechanism shall be enclosed in a molded bakelite case and shall be sealed to prevent tampering.

B. Circuit breakers shall be not less than 1" wide per pole. Tandem, twin, duplex, or thin types are not acceptable.

C. The circuit breakers shall be operable in any position and shall be removable from the front of the panelboard without disturbing adjacent units.

D. All breakers shall be numbered and shall be of same manufacture as panelboards.

2.05 SAFETY SWITCHES

A. Safety switches shall be heavy duty type for service voltage as required and shall have NEMA 1 enclosure for indoor service and NEMA 3R enclosure for outdoor use. Motor switches shall be horsepower rated. Switch mechanism shall be quick-make, quick-break. Cover shall be interlocked with mechanism to prevent unauthorized opening unless switch is in the "off" position. Switches shall be as manufactured by Cutler-Hammer, Square D, or Westinghouse.

2.06 WIRING TERMINALS

A. Special attention shall be given to types of wiring terminals to be furnished in panelboards, switches, etc. where aluminum conductors are used.

2.07 FUSE PROTECTION

A. A selective, coordinated system of fuse protection shall be provided for all circuits indicated or required to be protected by fuses. All fuses shall be of the same manufacturer and shall be Bussman, Chase-Shawmut, or General Electric.

B. Main, feeders and branch circuits shall be fused as follows:
   1. Fuses 601 amperes and larger shall be Bussman Type KRP-C Hi-Cap Current-Limiting fuses, or approved equal. The fuse must hold 300% of rated current for a minimum of 45 seconds.
   2. Fuses 600 amperes or smaller shall be Bussman Type LPS" or "KTN", low-peak, current limiting type.

C. Motor circuits with fuse protection shall be protected by Bussmann Low-Peak or Fusetron Dual-Element fuses or approved equal - except large motors requiring KRP-C Hi-Cap fuses in sizes larger than 600 amperes. Low-Peak or Fusetron fuses shall be installed not in excess of 125% of motor nameplate current rating except for special conditions where high ambient temperature prevails or where prolonged starting current is necessary - under such conditions the fuse should be 150 to 200% of motor full load current. Where fuse gaps are larger than size required for proper motor protection rating of fuse, use Bussman fuse reducers.

D. Provide Buss TRON-HEB in-line fuse-holder with appropriate fuse for all exterior pole-mounted lighting units and all other lighting units where required by notation on the drawings.

PART 3 - EXECUTION

3.01 PANELBOARDS

A. Location and mounting of panelboards shall be as indicated on the drawings. Where conflicts with other equipment or building features occur, the Contractor shall relocate the panel, as directed by the Owner's designated representative, anywhere within a 10 ft. radius of the location shown at no additional cost.

3.02 SPARE FUSES

A. Spare fuses shall be placed in a suitable, metal, painted, hinged door cabinet on the wall of the switchgear room or as directed by Owner. The cabinet size and strength shall be determined by the number of spare fuses required.
   1. Three spare fuses shall be provided for all sizes 601 amperes and larger.
   2. Ten (10) percent spare fuses of all other types and rating shall be provided and not less than 3 of any one rating.

END OF SECTION

SECTION 16500

LIGHTING

PART 1 - GENERAL

1.01 SUMMARY

A. The Electrical Contractor shall furnish all luminaires, lighting equipment and components shown on the plans, listed in the Fixture Schedule on the Drawings, the fixture schedule included herein, and specified herein. He shall furnish all labor and materials to install specified equipment in the manner indicated.

B. All luminaires and lighting equipment shall be delivered to the project site complete with suspension accessories, canopies, hickeys, casings, sockets, holders, reflectors, ballast, diffusing material, louvers, plaster frames, recessing boxes, etc., all wired and assembled as indicated.

C. The Electrical Contractor shall furnish and install lamps and accessory wiring as specified herein.

D. Luminaires with medium-base sockets shall be wired with no smaller than No. 16 "AWG" and Mogul Sockets with no smaller than No. 14 "AWG" Fixture wire and not less than 90°C insulation.

E. Fluorescent luminaires shall be wired with no smaller than No. 16 "AWG" Fixture wire. No splice or tap shall be located within an arm, stem or chain. Wire shall be continuous from splice in outlet box of the building wiring system to lamp socket, or to ballast terminals and shall be no smaller than No. 12 "AWG" and not less than 90°C insulation.

1.02 REFERENCE STANDARDS

A. Comply with the following standards:
   1. ETL - Electrical Testing Laboratories, Inc.
   2. CBM - Certified Ballast Manufacturers.

PART 2 - PRDUCTS

2.01 LAMPS

A. High Intensity Discharge Lamps: Shall be of the wattage, voltage and lumen output, horizontal or vertical burning type, with a rated average life, as that of lamps manufactured by the General Electric Co. or approved equal, as indicated in the Fixture Schedule. Lumen output at 70% rated life shall not be less than 80% of initial output. Any lamp failing during the first 120 days of burning shall be considered defective and shall be replaced and installed without cost by the Electrical Contractor.

B. Fluorescent Lamps: Shall be of the wattage, voltage and lumen output, with a rated average life as that of lamps manufactured by the General Electric Co. or approved equal, as indicated in the Fixture Schedule. Lumen output at 33% rated life shall not be less than 80% of initial output. Any lamps failing during the first 80 days of burning shall be considered defective and shall be replaced and installed without cost by the Electrical Contractor. Lamp color shall be as indicated.

C. Incandescent Lamps: Shall be of the wattage as indicated in the Fixture Schedule, with a rated average life of 2,000 hours for "PAR" and "R" lamps, 2,000 hours for quartzline, 4,000 hours for "PAR-Q" lamps and 750 hours for "A" - "PS" lamps. Lumen output at 70% of rated life shall not be less than 80% of initial output. Any lamps failing during the first 20 days of operation shall be considered defective and shall be replaced and installed by the Electrical Contractor without cost to the Owner.

2.02 BALLASTS

A. All fluorescent ballast shall be UL Listed and of the high-powered factor type with resetting thermal protectors and their design and construction shall conform to the "Certified Ballast Manufacturer's Standards", for Class "P" Sound Rated A. Ballast for outdoor installations shall be rated for low temperature operation.

B. Electronic ballast: Provide electronic ballast where indicated on the drawings.

C. All high intensity discharge ballast shall be of the regulating, high-power factor (.90 or above) saturated iron or grain originated silicon iron and encapsulated. Capacitors to be field replaceable. Ballast shall be capable of maintaining correct lamp operation over a voltage input of ±10% from normal, in addition to accepting a voltage input reduction of 40% minimum before lamp dropout occurs. Ballast shall have Class "F" insulation, designed for 105° F ambient, suitable for operation of both mercury and multi-vapor lamps, designed to start lamps at ambient temperature of -20°F and have a 10KV nominal BIL minimum.

2.03 LENS

A. Lens for Fluorescent troffers shall be clear acrylic, Type K-12, (.125") or as otherwise indicated on the drawings.

2.04 THERMAL CUT-OUT

A. Recessed Incandescent Fixtures shall have UL Listed Thermal Cut-Out protection.

2.05 FIXTURES

A. Fixture installed in T-bar type ceilings shall be installed as required by NEC 410-16(c).

2.06 EMERGENCY LIGHTING UNITS

A. Emergency lighting units shall be self-contained units, to comply with UL 924. Units include the following features:

1. Battery: Sealed, maintenance-free, lead-acid type with minimum 10-year nominal life and special warranty.

2. Charger: Fully automatic, solid-state type with sealed transfer relay.

3. Operation: Relay automatically turns lamp on when supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps, and battery is automatically recharged and floated on charger.

4. Integral Time-Delay Relay: Arranged to hold unit on for fixed interval after restoring power after an outage. Provides adequate time delay to permit high-intensity-discharge lamps to restrike and develop adequate output.

PART 3 - EXECUTION

3.01 INSTALLATION

A. This contractor shall take special note of the voltage at which fluorescent and high-intensity discharge fixtures are to be operated.

B. It shall be the responsibility of the Contractor to assure his count by type as well as voltage prior to ordering. Extras will not be allowed for any errors by this Contractor.

C. All fixtures shall be square and level in relation to surrounding materials and space.

D. Lamps are exempt from the one-year guarantee, but one complete set of clean and operating lamps shall be in place at the time of final inspection.

E. This Contractor shall coordinate with the ceiling contractor before ordering fixtures to ensure that the fixtures ordered have the proper mounting features to be compatible with the ceiling type.

F. All fixtures shall be protected from general construction and shall be thoroughly cleaned prior to final inspection.

G. All ceiling mounted fixtures shall be supported independently of the ceiling membrane except where otherwise required.

H. All fixtures intended for floodlighting or spotlighting shall be aimed at night for optimum illumination of the area or object intended.

I. Outdoor poles shall be installed on a reinforced concrete base. The Contractor is hereby instructed to have the pole bases designed by a structural engineer to suit the actual poles to be installed and to suit the soil conditions encountered. Poles shall otherwise be installed in accordance with manufacturer's recommendations. Complete installation, including fixtures, shall be capable of withstanding 80-mph steady wind with gusts up to 100 mph.

3.02 GUARANTEE/WARRANTY

A. Contractor shall provide a bid alternate price to fully warranty all lamps for replacement for one year from the date of substantial completion. Contractor shall bear the full costs for materials and labor to replace lamps.

END OF SECTION

SECTION 16540
LIGHTING DIMMING CONTROLS

PART 1. GENERAL

1.01 INTRODUCTION

A. The intent of this specification is to provide for furnishing, installing, testing and placing in operation, the necessary equipment for switching and dimming control of lighting. The work covered in this section is subject to all of the requirements in the general conditions of the specifications. Contractor shall coordinate all of the work in this section with all the trades covered in the other sections of the specification to provide a complete and operative lighting control system.

1.02 DESCRIPTION OF WORK

A. Extent of lighting control system work is indicated by drawings and by the requirements of this section. It is defined to include intelligent lighting control panels, switch inputs, wiring and ancillary programming equipment. Type of lighting control equipment and wiring specified in this section includes the following:
   1. Programmable Lighting Control Relay/Dimmer Panels stand-alone and network
   2. Remote over-ride switch panels
   3. Remote preset dimming control panels
   4. Central Lighting Control Operation and Programming computer

B. Requirements are indicated elsewhere in these specifications for work including, but not limited to, raceways, electrical boxes and fittings, and routers or other network components required for installation of control equipment, which are not work of this section.

1.03 QUALITY ASSURANCE

A. Independent Testing Laboratory - The control panels shall be tested and listed under the UL 916 Energy Management Equipment standards by a nationally recognized testing laboratory.

B. [option] System Checkout and training - A factory trained technician or other factory authorized personnel shall functionally test the system and verify performance after contractor installation. Factory authorized personnel shall conduct a training session (8 hours max) to train the building operations personnel on the set-up, programming, operation and maintenance of the lighting control system.

C. [option] Factory Programming – The system shall be turned over to the owner fully programmed and ready for immediate operation. It shall be the responsibility of the contractor to coordinate with the owner and supply the necessary “as-installed” information and desired schedules to the manufacturer in a timely manner.

D. Manufacturer experience - To insure a uniform installation and single responsibility, all the equipment described herein shall be supplied by a single manufacturer. Manufacturer shall have a minimum of 10 years experience in lighting control systems.

E. Dimming system is specified per (substitutions shall be reviewed by engineer before bid):

   Lithonia Lighting
   One Lithonia Way, Decatur, GA 30035
   1-770-987-4200, Fax 1-770-987-1002

F. Dimming system is modeled around Synergy Lighting Control System. Alternate products meeting prior approval requirements may be proposed as add or deduct alternate only.

1.04 CODES AND STANDARDS

A. Network - ANSI 875.1, ARCNET®
B. Protocol - ASHRAE 135 – 1995, BACnet®
C. IEEE Std 2000.1-1998
D. UL 916 Energy Management Equipment
E. California Energy Commission

1.05 SUBMITTALS

Prior to fabrication manufacture shall submit the following materials for approval.

A. Manufacturer's published catalog data sheets for all equipment and components of the lighting control system.
B. Shop Drawings - Submit drawings of lighting control system and accessories including, but not necessarily limited to, the central programming system, intelligent relay panels, network wiring, switch inputs, analog inputs and modem location. As a minimum, the shop drawings shall include the following:
    1. One-line riser diagram with wire type details
    2. Control system network wiring details
    3. Lighting control panel load schedules
    4. Input and output wiring details
    5. Programming worksheets for system configurations

PART 2. PRODUCTS

2.01 SYSTEM DESCRIPTION

A. The lighting control system shall integrate all aspects of lighting control and be capable of dimming, switching, lighting automation and lighting energy management functions in a single scalable assembly.
B. The system shall consist of intelligent lighting control panels with programmable inputs and integral astronomic time-clock. Lighting control panels shall provide up to 48 - 20 amp relay outputs, 30 dimmer outputs, or a combination of both dimmers and relays.
C. [option] The system shall be capable of networked operation making possible the sharing of schedules and overrides between lighting control system enclosures. All inputs shall be transferable over the network to create any switching or dimming pattern required.
D. Lighting control system shall permit lighting to be overridden ON for after-hours use and cleaning. Overrides shall be hard-wired inputs or optional voice-guided touch-tone telephone control. Any control pattern shall be available from any override in the system. Overrides may be programmed to time out after up to two hours during after-hours use.
E. Programming shall be accomplished through a local keypad and display or off-line through a personal computer with optional configuration software.

2.02 HARDWARE

The lighting control system shall consist of lighting control enclosures, power modules, programmable system controllers, and other ancillary accessories as herein specified.

A. Enclosure
    1. Lighting control system enclosure shall be NEMA 1, wall mounted code gage steel cabinet. Enclosure and contents shall be designed to operate in interior spaces with temperatures of 32°-104° F (0°-40° C), humidity 0-90% non condensing. Enclosure shall be available with optional recessed mounting hardware, see drawings for mounting requirements.

2. Enclosure Dimensions:
    a.) Small - 21”(533mm) H X 20”(508mm) W X 6”(152mm) two power modules maximum.
    b.) Medium - 34.5”(876mm) H X 20”(508mm) W X 6”(152mm) four power modules maximum.
    c.) Large - 48”(1,219mm) H X 20”(508mm) W X 6”(152mm) six power modules maximum.
3. Multi-tapped Transformer - The enclosure shall be supplied with multi-tapped transformer and shall not require specification of voltage for each control location. Provide a dedicated power feed of 120/230/277VAC, 50/60 Hz, 225 VA. for each enclosure.
4. Modular Design - The power modules and system controller shall be modular and designed for ease of field service or upgrade. Lighting control system enclosure shall be available from factory stock to facilitate rough-in requirements.

B. Relay Power Modules
1. Mechanical - All power module components shall be mounted to heavy steel back plane. Module shall install into enclosure with keyed tab and slot hardware, secured in place with heavy duty screws.
2. Input/output features - Power module shall provide low voltage switch input, pilot light output, analog input, and line voltage output control of lighting loads. Power modules shall be operable without the system controller installed for direct operation of lighting loads or with the system controller for programmable input to output mapping. Each module shall provide the following:
    a.) Eight 20 amp output relays
    b.) Eight override switch inputs
    c.) Pilot light output per relay
    d.) Two analog inputs each configurable for 0 – 10v or 4 – 20 mA operation
    e.) 24VDC accessory power terminals
3. Relay Status Indicators - The system shall provide ON/OFF status indication of all relay outputs via LED indicators.
4. Relays - Control relays shall be SPST, normally open with enclosed silver cadmium-oxide isolated contacts. Relays shall be rated to at least 16 amps at 277 VAC electronic or HID ballast, 15 amps 120VAC tungsten. The relays shall be magnetically held by DC current. A limited 10-year warranty shall be provided on the individual relays.
5. Arc-less Load Switching - The system shall limit the effect of inrush current on relay contacts by restricting the change-state timing of the output relays to occur within +/- 10% of the zero cross point of the output wave form.
6. Switch Inputs - Each power module shall provide for eight (8) dry contact inputs for override purposes. Momentary or maintained contacts shall be supported as latching 3-wire momentary, 2-wire momentary alternate action or 2-wire maintained contact. Inputs shall be dry contact with 12 VDC, 12 mA. internally sourced. Inputs shall be linkable to any number of relays for override control.
7. Analog Inputs - Two inputs per module shall be capable of monitoring external analog sensing devices such as a photocell. It shall be possible, through the system logic, to control the output relays in response to analog input values. Provide 100 steps of analog control resolution.
8. Service Override Switch - Each relay module shall have an On/Auto/Off service override switch that shall control all relay outputs on the module. Whenever active, the On or Off override condition shall be visually and audibly annunciated via the UIP on the system controller.

C. Dimming Power Modules
   1. Mechanical - All power module components shall be mounted to heavy steel back plane. Module shall install into enclosure with keyed tab and slot hardware, secured in place with heavy duty screws.
   2. Input/output features - Dimmer module shall provide low voltage switch input, analog input, and line voltage output control of lighting loads. Dimmer modules shall be operable without the system controller installed for direct operation of lighting loads or with the system controller for programmable input to output mapping. Each module shall provide the following:
      a.) Six 20 amp relays with output terminal blocks
      b.) Six universal dimmers with output terminal blocks
      c.) Two switch inputs, configurable for raise/lower or on/off operation
      d.) Three analog inputs, configurable for 0 – 10v or 4 – 20 mA operation
      e.) Two 24VDC accessory power terminals
   3. Dimmed Status Indicators - The system shall provide a dimmed status indication of all outputs via LED indicators.
   4. Relays - Air gap control relays shall be SPST, normally open with enclosed silver cadmium-oxide isolated contacts. Relays shall be rated to at least 16 amps at 277 VAC electronic or HID ballast, 15 amps 120VAC tungsten. The relays shall be magnetically held by DC current.
   5. Sources - Dimmers shall be "universal" type rated for use with incandescent, low voltage, neon, cold cathode, and fluorescent. Digital firing circuits shall ensure that all dimmers set to the same intensity will track together. No adjustments shall be required to ensure this operation.
   6. Rise Time - Dimmers shall use toroidal filters to reduce RFI and lamp filament noise. Filter design shall limit current rise time of output wave form to a minimum of 350 microseconds, measured between 10 and 90 percent of total rise with dimmer control set at one half.
   7. Response to control – Dimmer response curve shall be selectable via the UIP on the system controller and shall provide a means to optimize the dimmer response to control for the lamp type being controlled.
   8. High/low trim – It shall be possible to set high end and low end trim points for each dimmer individually via the UIP on the system controller.
   9. Switch Inputs - Each dimmer module shall provide two (2) dry contact inputs for override purposes. Momentary or maintained contacts shall be supported as latching 3-wire momentary, 2-wire momentary alternate action or 2-wire maintained contact. Inputs shall be dry contact with 24 VDC, 12 mA. internally sourced. Inputs shall be linkable to any number of relays or dimmers for override control.
   10. Analog Inputs - Three inputs per dimmer module shall be capable of monitoring external analog devices such as a photocell or potentiometer. It shall be possible, through the system logic, to control the output relays in response to analog input values. Provide 100 steps of analog control resolution.
   11. Diagnostic features – It shall be possible to directly set dimmer intensity, read current dimmer intensity value and read input control signal values via the UIP on the system controller.
   12. Service Override Switch - Each dimming module shall have an On/Auto/Off service override switch that shall control all outputs on the module. Whenever active, the On or Off override condition shall be visually and audibly annunciated via the UIP on the system controller.

D. System Controller
   1. Mechanical - The system controller shall be supplied as a modular chassis consisting of the user interface panel, system control electronics, and provision for installation of up to four industry standard half length ISA accessory boards. The system controller shall plug-into the enclosure as an assembly for ease of installation, service, or upgrade. Do not install system controllers into the enclosures until after the rough-in phase of installation is complete.
   2. User Interface Panel (UIP) - The user interface shall provide a simple means to set-up, program, and monitor the lighting control system. Provide as a minimum the following features:

a.) Multi-lingual operation in English, Spanish or French
b.) Four line, eighty character LCD display with back light
c.) Four multi-function menu selection keys graphically associated with the LCD display
d.) A twelve key, numeric keypad with Enter and Back functions
e.) A four key menu navigation and selection keypad with Up, Down, plus (+) and minus (-) function keys
f.) LED status indicators for Network, DMX512 input and Local input/output buss.

3. Capacity - The system controller shall have the capacity to operate up to 12 power modules in two enclosures, permitting up to 96 points of control from each system controller.
4. Printer Port - Provide a front mounted plug for connection of a printer. It shall be possible to print all user programming, event data, and log data directly from the system controller without the need for a personal computer.
5. RS232 Port - Provide a front mounted DB9 serial connector for connection of a personal computer or other external serial device. Provide a second DB9 serial connector within the enclosure for connection of internal serial devices.
6. [option] RS485 ARCNET port – Provide an internal terminal block connection for the network buss wire connection.
7. RS485 Control Station port – Provide an internal terminal block connection for the dimming control station and/or addressable button station buss.
8. Program Back-up - The user program shall be stored in non volatile memory. The system shall utilize a memory back-up device that is system integrated, maintenance free and not require batteries for retention of memory.

E. Preset Dimming Control Stations - Preset controls stations shall provide 6 presets, master raise/lower, individual raise/lower, and off control for 4, 8, 12, or 16 control channels as indicated. Faceplates shall attach to mounting frame without visible screws and, when in place, shall provide a clean architectural appearance. Full-length piano hinge shall allow faceplate to fold down flat against wall when open. Standard faceplate finish shall be brushed stainless steel. Optionally, brushed aluminum, polished stainless steel, polished brass or painted white, black or ivory shall be supplied as indicated. Controls shall be capable of storing a total of 16 presets. Selectable fade times for each preset shall be provided. Available fade times shall be INSTANT, 5, 10, 15, 30, 45 seconds or 1, 5, 10, 30, 60 minutes.. Each channel shall have an associated 10 segment LED bar graph which shall indicate the intensity of the lighting. Master raise/lower function shall adjust intensity of all control channels simultaneously.

2.03 FIRMWARE FEATURES

A. [option] Open Protocol Networking - To insure interoperability with other building systems, the lighting control panels shall communicate over the network using the BACnet® (ASHRAE 135- 1995) communication standard. Systems requiring a gateway device for BACnet communications shall provide one gateway for each lighting control panel location shown on the plans.
B. Groups - It shall be possible to associate output relays into logical control groups. Any “group” shall be assign-able to schedule events, switch inputs, analog inputs or telephone overrides as a single entity. It shall not be necessary to program functions or schedules individually for each output relay.
C. Outputs - Outputs shall be individually settable through the system controller to respond as normally open, normally closed, momentary on, momentary off, or for Sentry™ switch operation. Outputs shall respond as programmed when the service override switch is activated.
D. Astronomic Clock - The system clock shall of the astronomical type and be capable of calculating the correct time for sunrise and sunset. It shall be possible to set control functions to occur at or up to 99 minutes before or after sunrise or sunset.
E. Daylight Savings Time - The system shall automatically adjust for daylight savings time. It shall be possible to disable this function.

F. Schedules - The system shall support the creation of up to 99 unique lighting control schedules. The quantity of time schedule events contained in the schedules shall be limited only by the available system memory and shall be dynamically allocated to the schedules such as to not limit the capacity of any single schedule.

G. Schedule Assignment - Unique schedules may be assigned to each day of the week to create a rotating Monday through Sunday weekly operating scenario. A unique holiday schedule shall automatically supercede assigned weekday schedules based on a list of holiday dates. Alternately, schedules may be assigned to specific calendar dates. A schedule assigned to a calendar date shall have priority over a schedule assigned to a Monday through Sunday upon which the calendar date occurs such that only one schedule runs on any given day.

H. Overrides - It shall be possible to override schedule operation and force outputs to an On or Off state. Overrides shall be initiated from a variety of system sources including switch inputs, analog inputs, telephone interface, modem, or network. Three types of override shall be available:
   1. Standard - Under normal conditions, a group can be overridden On or Off by any available input source programmed to control the group. The group will remain in the overridden condition until changed by a schedule event or by another override source.
   2. Priority On - The priority On override shall force the group On and not allow further control until the priority On override is released by the source. A priority On override shall cancel automatically after 24 hours and the group shall revert to schedule operation if applicable. In the event of overlap, priority On shall take precedence over priority Off.
   3. Priority Off – The priority Off override shall force the group Off and not allow further control until the priority Off override is released by the source. A priority Off override shall cancel automatically after 24 hours and the group shall revert to schedule operation if applicable.

I. Transmit - Each system controller input and output shall include provision to annunciate it's actuation over the network making the event available for use by all controllers on the network. This function shall be set via the UIP on the system controller and not require the use of a personal computer for inter-panel operation over the network.

J. Flash to Find - It shall be possible to set any output relay, group or dimmer to continuously flash on and off to facilitate easy location of undocumented loads. The flash to find function shall automatically cancel after two minutes.

K. Status - Each system controller shall be capable of displaying the current real time status of all inputs and outputs associated with the controller.
   1. Input Status – The current state of each input shall be displayed as On or Off for switch inputs or as a value for analog inputs.
   2. Output Status – The current state of each output shall be displayed as On or Off for relay outputs or as a percentage value for dimmed outputs.
   3. Network Status – The network status display shall indicate that the system controller is actively communicating on the local input/output buss and the network by displaying network message traffic expressed as a percentage of capacity. This display shall also indicate the currently available system RAM and flash disk memory.

L. Logging - The system controller shall automatically retain a record of system control events and run times and shall make this information available to the user via the UIP on the system controller.
   1. Event Log - The system shall automatically log in memory and write to the printer, if attached, key actions performed by the system controller. . Each log entry shall be time and date stamped. It shall be possible to view or print the event log via the UIP. A minimum of 2000 system events shall be saved before the system begins to overwrite the oldest data. Logged actions shall include but not be limited to:
      a.) Power up
      b.) Power down
      c.) Input change of state
      d.) Output change of state
      e.) Manual override
      f.) New script
      g.) Alarms

2. Relay Run Time - A cumulative “on” time record shall be accumulated for each output. It shall be possible to view and reset the run-time for each output via the UIP.
3. Relay Starts - A counter shall track the quantity of starts for each output. It shall be possible to view or reset the number of starts for each output from the UIP.

M. Script File - All system parameters and user programming shall be stored within the system controller in the form of an editable text file. It shall be possible to upload and download the file between the system controller and a personal computer using any suitable terminal emulation program. The script file shall be user editable using a text editor or word processing software.

N. Script Logic - The system controller logic shall support the creation of customized logical control scenarios. Scenarios shall be created off line using the optional Windows® based configuration software package. As a minimum, the system shall understand and process “basic” IF, THEN, ELSE, AND , = (equal), < (less than), and > (greater than) logical statements. Commands and operations to be tested and/or acted upon shall include as a minimum: DAY, DATE, TIME, INPUT, OUTPUT, INC COUNTER # (increment counter #), DEC COUNTER (decrement counter #), and RESET COUNTER.

2.04 CONFIGURATION SOFTWARE

A. The system shall support the use of optional off-line personal computer based software for user programming and monitoring of system status and operation. The configuration software shall be a 32 bit application and shall run on any personal computer using the Windows95/98/NT operating system.

B. It shall be possible to upload, edit, and download user program and log data through a direct connection to the lighting control system network or remotely through the use a telephone modem.

C. The configuration software shall have the ability to “learn” the hardware components that are present in the system and automatically configure a Script file using default values which may then be edited by the user.

D. The system shall support the simultaneous use of multiple personal computers.

E. The application shall be BACnet compliant and designed to co-reside on a PC workstation running other BACnet building control applications.

F. [option] Provide a graphical control and monitoring module integral to the configuration software application to provide for real time monitoring and control of lighting zones via control and status icons superimposed over customized screen graphic images. It shall be possible to import graphic images from a variety of sources in a number of formats including: jpg, bmp, gif, dib, and wmf. Control elements shall be user selectable from a tool bar menu and shall include: status box, ON button, OFF button, custom button, text box, intensity slider, and “LED” indicator icon. It shall be possible to create screen “hot spots” to facilitate the calling of other graphic screen images via position sensitive mouse click in a hyperlink fashion.

PART 3. EXECUTION

3.01 EQUIPMENT INSTALLATION AND DOCUMENTATION

A. Installation - The control system shall be installed and connected as shown on the plans and as directed by the manufacturer. The contractor shall complete all electrical connections to all control circuits, network terminations, RS-232 connections, sensors and override wiring.

B. Telephone Lines - The contractor shall arrange for all required telephone lines and touch-tone telephone override wiring as shown on the plans. All phone connections shall be terminated into RJ-11 modular telephone. If multiple lines are required, they shall be installed on a rotating line such that when one line is busy the call will automatically switch to the next line.

C. Documentation - The contractor shall provide accurate "as built" drawings to the owner indicating the correct and latest program in each controller. The "as-built drawings" shall clearly indicate the lighting control panel identification, the load controlled by each relay, and the device connected to each input.
D. Operation and Service Manuals – Provide operation and service manuals for all system components as indicated in the General Provisions.

3.02 PRODUCT SUPPORT AND SERVICE

A. System Start-up
Provide a factory authorized technician to verify the installation, test the system, and train the owner on proper operation and maintenance of the system. Before requesting start-up services, the installing contractor shall verify that:
1. The control system has been fully installed in accordance with manufacturer's installation instructions.
2. Phone lines have been checked for dial tone.
3. Low voltage wiring for overrides and sensors is completed.
4. Accurate "as-built" load schedules have been prepared for each lighting control panel.
5. Proper notification of the impending start-up has been provided to the owner’s representative.

B. Factory Support
Factory telephone support shall be available at no cost to the owner during the warranty period. Factory assistance shall consist of assistance in solving programming or other application issues pertaining to the control equipment. The factory shall provide a toll-free number for technical support.

3.03 WARRANTY

Manufacturer shall provide a one (1) year limited warranty on the lighting control system and software. A ten (10) year limited warranty shall be provided on the lighting control relays.

END OF SECTION

SECTION 16720

FIRE ALARM SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section of the specification includes the furnishing, installation, and connection of the microprocessor controlled, intelligent reporting fire alarm equipment required to form a complete coordinated system ready for operation. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, control panel, auxiliary control devices, annunciators, and wiring as shown on the drawings and specified herein.

B. The catalog numbers specified in the following are those of Notifier, a Division of the Pittway Corporation and constitute the type and quality of the equipment to be furnished. Equipment manufactured by others as listed in approved substituted equipment list may be considered as long as all the features listed below are provided.

C. The company supplying the fire alarm equipment shall employ NICET certified employees. The Project Manager shall be NICET Level III and all technicians utilized on-site to guide the final checkout and to ensure the systems integrity shall be NICET Level II. NICET Certifications of all employees shall be included in submittal packages.

1.02 SCOPE

A. A new intelligent reporting, microprocessor controlled fire detection system shall be installed in accordance to the project specifications and drawings.

B. Basic Performance:
1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on a (Class B) Signaling Line Circuit (SLC).
2. Initiation Device Circuits (IDC) shall be wired Class B.
3. Notification Appliance Circuits (NAC) shall be wired Class B.
4. Digitized electronic signals shall employ check digits or multiple polling.
5. A single ground or open on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
6. Alarm signals arriving at the main FACP shall not be lost following a power failure (or outage) until the alarm signal is processed and recorded.

C. BASIC SYSTEM FUNCTIONAL OPERATION

When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:
1. The system alarm LED shall flash & local piezo electric signal in the control panel shall sound.
2. A backlit 80-character LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
3. Transmit signal to central station.
4. Release all magnetically held doors.
5. Shutdown all Air Handling Units.
6. Continuously sound all audible and flash all visual indicating appliances until system is silenced or restored to normal and reset.

1.03 SUBMITTALS

NOTE: Fire alarm submittals will only be approved for 'type of system' unless full shop drawings, as indicated below, are included.

A. General:
   1. Two copies of all submittals shall be submitted to the Architect/Engineer for review.
   2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent equipment (compatible UL Listed) from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.
   3. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

B. Shop Drawings:
   1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
   2. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.

C. Certifications:
   Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of the installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.04 GUARANTEE

All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

1.05 APPLICABLE STANDARDS AND SPECIFICATIONS:

The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards.

A. National Fire Protection Association (NFPA) - USA:

B. Underwriters Laboratories Inc. (UL) - USA:

C. Local and State Building Codes.

D. All requirements of the Authority Having Jurisdiction (AHJ).

1.06 APPROVALS:

A. The system shall have proper listing and/or approval from the following nationally recognized agencies:
   UL Underwriters Laboratories Inc
   FM Factory Mutual

B. The fire alarm control panel shall meet UL Standard 864, (Control Units) and UL Standard 1076 (Proprietary Burglar Alarm Systems).

C. The system shall be listed by the national agencies as suitable for extinguishing release applications.

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIAL, GENERAL

A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protective signaling system, meeting the National Fire Alarm Code.

B. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.

C. All Equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

2.02 CONDUIT AND WIRE

A. Conduit:
1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.
2. Where possible, all wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.
3. Cable must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760-29.
4. Wiring for 24 volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
5. Conduits shall not enter the Fire Alarm Control Panel, or any other remotely mounted Control Panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.
6. Conduit shall be 3/4 inch minimum.

B. Wire:
1. All fire alarm system wiring shall be new.
2. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.63 mm) for Notification Appliance Circuits.
3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.

4. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR).
5. Wiring used for the multiplex communication loop shall be twisted and shielded and support a minimum wiring distance of 10,000 feet (254 m). The system shall support up to 1,000 ft. (25.4 m) of untwisted, unshielded wire. The system shall permit use of IDC and NAC wiring in the same conduit with the communication loop.
7. All field wiring shall be completely supervised.
8. The Fire Alarm Control panel shall be capable of T-Tapping Class B (NFPA Style 4) Signaling Line Circuits (SLC's). Systems, which do not allow or have restrictions in, for example, the amount of T-Taps, length of T-Taps etc., are not acceptable.

C. Terminal Boxes, Junction Boxes and Cabinets: All boxes and cabinets shall be UL listed for their use and purpose.

D. Initiating circuits shall be arranged to serve like categories (manual, smoke, water flow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.

E. The Fire Alarm Control Panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the Main Power Distribution Panel as FIRE ALARM. Fire Alarm Control Panel Primary Power wiring shall be 12 AWG. The Control Panel Cabinet shall be grounded securely to either a cold water pipe or grounding rod.

2.03 MAIN FIRE ALARM CONTROL PANEL

A. The FACP shall be a NOTIFIER Model AFP-200 or NFS-640 and shall contain a microprocessor based Central Processing Unit (CPU). The AFP-200 System shall be utilized with facilities requiring less than 99 Intelligent Detectors or 99 Modules.
The NFS-640 Panel shall be provided for systems requiring up to 318 Intelligent Detectors or Modules. The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent detectors, addressable modules, annunciators, and other system controlled devices.

B. System Capacity and General Operation
1. The control panel shall provide, or be capable of expansion to 198/396 intelligent/addressable devices.
2. The system shall include Form-C alarm and trouble relays rated at a minimum of 2.0/3.0 amps @ 30 VDC. It shall also include four Class B (NFPA Style Y) programmable Notification Appliance Circuits.
3. The system shall support up to 99 programmable EIA-485 driven relays for an overall system capacity of 301 circuits.
4. The Fire Alarm Control Panel shall include a full featured operator interface control and annunciation panel that shall include a backlit Liquid Crystal Display, individual, color coded system status LEDs, and an alphanumeric keypad for the field programming and control of the fire alarm system.
5. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the Fire Alarm Control Panel.
6. The FACP shall provide the following features:
   a. Drift Compensation to extend detector accuracy over life.
   b. Sensitivity Test, meeting requirements of NFPA 72, Chapter 5.
   c. Maintenance Alert to warn of excessive smoke detector dirt or dust Accumulation.
   d. System Status Reports to display or printer.

e. Alarm Verification, with verification counters.
f. PAS presignal, meeting NFPA 72 3-8.3 requirements.
g. Rapid manual station reporting (under 2 seconds).
h. Non-Alarm points for general (non-fire) control.
i. Periodic Detector Test, conducted automatically by software.
j. Pre-alarm for advanced fire warning.
k. Cross Zoning with the capability of: counting two detectors in alarm, two software zones in alarm, or one smoke detector and one thermal detector.
l. March time and temporal coding options.
m. Walk Test, with check for two detectors set to same address.
n. UL 1076 Security Monitor Points.
o. Control-By-Time for non-fire operations, with holiday schedules.
p. Day/Night automatic adjustment of detector sensitivity.
q. Device Blink Control for sleeping areas.

7. The FACP shall be capable of coding Notification circuits in March Time (120 PPM), Temporal (NFPA 72 A.2.2.2.2), and California Code.

C. Central Microprocessor

1. The Microprocessor shall communicate with, monitor, and control all external interfaces with the control panel. It shall include EPROM for system program storage, non-volatile memory for building-specific program storage, and a "watch dog" timer circuit to detect and report microprocessor failure.
2. The microprocessor shall contain and execute all control-by-event programs for specific action to be taken if an alarm condition is detected by the system. Control-by-event equations shall be held in non-volatile programmable memory and shall not be lost even if system primary and secondary power failure occurs.
3. The microprocessor shall also provide a real-time clock for time annotation of system displays, printer, and history file. The time-of-day and date shall not be lost if system primary and secondary power supplies fail. The real time clock may also be used to control non-fire functions at programmed time-of-day, day-of-week, and day-of-year.

D. Display

1. The display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.
2. The display shall include status information and custom alphanumeric labels for all intelligent detectors, addressable modules, and software zones.
3. The display shall provide an 80-character back-lit alphanumeric Liquid Crystal Display (LCD). It shall also provide 5 Light-Emitting-Diodes (LEDs), that will indicate the status of the following system parameters: AC POWER, SYSTEM ALARM, SYSTEM TROUBLE, SIGNAL SILENCED, SUPERVISORY, and PRE-ALARM.
4. The Display shall provide a 21-key touch key-pad with control capability to command all system functions, entry of alphabetic or numeric information, and field programming. Two different password levels shall be provided to prevent unauthorized system control or programming.
5. The Display shall include the following operator functions: SIGNAL SILENCE, RESET, DRILL, and ACKNOWLEDGE.

E. Signaling Line Circuit (SLC)

1. The SLC interface shall provide power to and communicate with up to 99 intelligent detectors (Ionization, Photoelectric, or Thermal) and 99 intelligent modules (monitor or control) for a system capacity of 198 devices. This shall be accomplished over a single SLC loop and shall be capable of NFPA 72 Style 4, Style 6, or Style 7 wiring.

2. The loop interface shall receive analog information from all intelligent detectors that shall be processed to determine whether normal, alarm, or trouble conditions exist for each detector. The software shall automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information shall also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.
3. The detector software shall meet NFPA 72, chapter 7 requirements and be certified by UL as a calibrated sensitivity test instrument.
4. The detector software shall allow manual or automatic sensitivity adjustment.

G. Enclosures:
1. The control panel shall be housed in a UL listed cabinet suitable for surface or semi-flush mounting. Cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.
2. The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators.

H. All interfaces and associated equipment are to be protected so that they will not be affected by voltage surges or line transients, consistent with UL standard 864.

I. Universal Digital Alarm Communicator Transmitter, Notifier UDACT. The UDACT is an interface for communicating digital information between a fire alarm control panel and a UL-Listed central station.
1. The UDACT shall be compact in size, mounting in a standard module position of the fire alarm control cabinet. Optionally, the UDACT shall have the ability for remote mounting, up to 6,000 feet (1828.8 m) from the fire alarm control panel. The wire connections between the UDACT and the control panel shall be supervised with one pair for power and one pair for multiplexed communication of overall system status. Systems that utilize relay contact closures are not acceptable.
2. The UDACT shall include connections for dual telephone lines (with voltage detect), per UL/NFPA/FCC requirements. It shall include the ability for split reporting of panel events up to three different telephone numbers.
3. The UDACT shall be completely field programmable from a built-in keypad and 4 character red, seven segment display.
4. The UDACT shall be capable of transmitting events in at least 15 different formats. This ensures compatibility with existing and future transmission formats.
5. Communication shall include vital system status such as:
   - Independent Zone (Alarm, trouble, non-alarm, supervisory)
   - Independent Addressable Device Status
   - AC (Mains) Power Loss
   - Low Battery and Earth Fault
   - System Off Normal
   - 12 and 24 Hour Test Signal
   - Abnormal Test Signal (per UL requirements)
   - EIA-485 Communications Failure
   - Phone Line Failure
6. The UDACT shall support independent zone/point reporting when used in the Contact ID format. In this format the UDACT shall support transmission of up to 2,040 points. This enables the central station to have exact details concerning the origin of the fire or response emergency.

J. An optional module shall be available which provides 8 Form-C relays rated at 5.0. The relays shall track programmable software zones.

K. Power Supply:
1. The Power Supply shall operate on 120 VAC, 60 Hz, and shall provide all necessary power for the FACP.
2. It shall provide 5.0 amps of usable Notification appliance power, using a switching 24 VDC regulator. A 3.0 amp Notification expansion power supply shall be available for the demanding requirements of UL 1971 and ADA devices, for a total system capacity of 8 amps.
3. It shall provide a battery charger for 24 hours of standby using dual-rate charging techniques for fast battery recharge.
4. It shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults.
5. It shall be power-limited per 1995 UL864 standards.
6. It shall provide optional meters to indicate battery voltage and charging current.

L. Field Charging Power Supply, Notifier FCPS-24: The FCPS is a device designed for use as either a remote 24 volt power supply or used to power Notification Appliances.
1. The FCPS shall offer up to 6.0 amps (4.0 amps continuous) of regulated 24-volt power. It shall include an integral charger designed to charge 7.0 amp hour batteries and to support 60-hour standby.
2. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a relay. Four outputs (two Style Y or Z and two style Y) shall be available for connection to the Notification devices.
3. The FCPS shall include an attractive surface mount backbox.
4. The Field Charging Power Supply shall include the ability to delay the AC fail delay per 1993 NFPA requirements.
5. The FCPS include power limited circuitry, per 1995 UL standards.

P. Field Programming
1. The system shall be programmable, configurable and expandable in the field without the need for special tools or electronic equipment and shall not require field replacement of electronic integrated circuits.
2. All programming may be accomplished through the standard FACP keypad.
3. All field defined programs shall be stored in non-volatile memory.
4. The programming function shall be enabled with a password that may be defined specifically for the system when it is installed. Two levels of password protection shall be provided in addition to a key-lock cabinet. One level is used for status level changes such as zone disable or manual on/off commands. A second (higher-level) is used for actual change of program information.
5. Program edit shall not interfere with normal operation and fire protection. If a fire condition is detected during programming operation, the system shall exit programming and perform fire protection functions as programmed.
6. A special program check function shall be provided to detect common operator errors.
7. An Auto-Program (self-learn) function shall be provided to quickly install initial functions and make the system operational.
8. For flexibility, an off-line programming function, with batch upload/download, shall also be available.

Q. Specific System Operations

1. Smoke Detector Sensitivity Adjust: A means shall be provided for adjusting the sensitivity of any or all analog intelligent smoke detectors in the system from the control panel. Sensitivity range shall be within the allowed UL window.
2. Alarm Verification: Each intelligent addressable smoke detector in the system shall be independently selected and enabled to be alarm verified. The alarm verification delay shall be programmable from 5 to 30 seconds. The FACP shall keep a count of the number of times that each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.
3. Point Disable: Any device in the system may be enabled or disabled through the system keypad.
4. Point Read: The system shall be able to display or print the following point status diagnostic functions:
    a. Device status.
    b. Device types.
    c. Custom device labels.
    d. View analog detector values.
    e. Device zone assignments.
    f. All program Parameters.
5. System Status Reports: Upon command from an operator of the system, a status report will be generated and printed, listing system status.
6. System History Recording and Reporting: The Fire Alarm Control Panel shall contain a History Buffer that will be capable of storing up to 650 system alarms/troubles/operator actions. Each of these activations will be stored and time and date stamped with the actual time of the activation. The contents of the History Buffer may be manually reviewed, one event at a time, or printed in its entirety. Although the foreground history buffer may be cleared for user convenience, a background, non-erasable buffer shall be maintained which provides the last 650 system events. The History Buffer shall use non-volatile memory. Systems that use volatile memory for history storage are not acceptable.
7. Automatic Detector Maintenance Alert: The Fire Alarm Control Panel shall automatically interrogate each intelligent smoke detector and shall analyze the detector responses over a period of time. If any intelligent smoke detector in the system responds with a reading that is below or above normal limits, then the system will enter the Trouble Mode, and the particular detector will be annunciated on the system display, and printed on the optional printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.
8. Pre-alarm Function: The system shall provide two levels of pre-alarm warning to give advance notice of a possible fire situation. Both pre-alarm levels shall be fully field adjustable. The first level shall give an audible indication at the panel. The second level shall give an audible indication and may also activate control relays. The system shall also have the ability to activate local detector sounder bases at the pre-alarm level, to assist in avoiding nuisance alarms.
9. Software Zones: The FACP shall provide 99 software zones. All addressable devices may be field programmed to be grouped into software zones for control activation and annunciation purposes.

2.04 SYSTEM COMPONENTS

A. Strobe Units shall be a Notifier S-241575. Strobe Unit shall be listed to UL 1971 and comply with Americans with Disabilities Act requirements.

B. Horn/Strobe Units shall be a Notifier P-241575. Horn/Strobe Unit shall be listed to UL 1971 and UL 464 and shall comply with Americans with Disabilities Act requirements. Strobes shall have a visual intensity of 177cd.

D. Manual Pull Stations shall be a Notifier NBG-12LX. Station shall be non-coded, with a key-operated reset lock. Station shall be double-action and shall be suitable for surface mounting or semi-flush mounting.

E. Ceiling Smoke Detectors in Hallways & Common Areas shall be a Notifier FSP-751 Photoelectric Smoke Detector Head utilizing a Notifier B710LP Base. Detector & Base shall be low-profile.

F. Wall mounted Smoke Detectors in Guest Rooms or Sleeping Areas shall be a Notifier FSP-751 utilizing a Notifier B501BH Sounder Base. This detector shall be configured as:
1. When the associated Smoke Detector with Sounder Base senses smoke, it shall create a supervisory condition at the Fire Alarm Control Panel. The sounder base will also activate to sound a local alarm on that sounder base only.
2. When a general alarm condition is initiated, all sounder bases are to activate along with all notification device appliances.
3. This mode of operation allows for the sounder bases to sound local alarms as well as serve as part of an entire notification appliance circuit for general alarms.

G. In ADA designated rooms, the system above may be installed, so long as the device provided includes a strobe device. Should the manufacturer not provide such a system, refer to the Drawings for an alternate instllation for these rooms only. Configuration remains the same as above.

H. Duct Mounted Smoke Detectors shall be a Notifier FSD-751P. Supply required sampling tube in length as required. Provide Notifier RTS-451 Remote Test Station with each detector.

J. Sprinkler Tamper and Waterflow Switches shall be provided by Division 15. However, each device shall require a Notifier FMM-1 Monitor Module for supervision.

K. Remote LCD Annunciator shall be a Notifier LCD-80TM. Surface mount backboxes shall be a Notifier ABS-1T. Flush mount backboxes shall be a Notifier ABF-1.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.

B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.

C. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

3.02 TEST

A. Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with NFPA 72, Chapter 7.

3.03 FINAL INSPECTION

A. At the final inspection a factory-trained representative of the manufacturer of the major equipment shall demonstrate that the systems function properly in every respect.

3.04 INSTRUCTION

A. Provide instruction as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.

B. The Contractor and/or the Systems Manufacturer's representatives shall provide a letter of certification that the system has been tested and meets all requirements of the manufacturer as well as local authorities having jurisdiction.

END OF SECTION

SECTION 16740

EMPTY CONDUIT SYSTEM FOR VOICE/DATA/CATV/WIRELESS INTERNET

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. The General Conditions, Instructions to Bidders, and all other general requirements of these specifications shall be considered a component part of this division of the specifications.

B. Bidders to this section shall review all other sections of these specifications. All items in other sections relating to this section are as binding on this bidder as if repeated herein.

1.02 SCOPE

A. This section covers the empty conduit, boxes, pull wires, etc. for the communications system cabling. Attention is directed to all other sections of this division of the specifications and to the conduit riser details included in the Drawings. A separate conduit system shall be installed as indicated for the high-speed wireless internet access system.

PART 2 - PRODUCTS

2.01 CONDUIT, BOXES, ETC.

A. Conduit, boxes, etc., shall be as specified in Section 16100 of these specifications and as indicated below.

PART 3 - EXECUTION

3.01 CONDUIT SYSTEM

A. All necessary conduits, wall boxes, plaster rings, and plywood mounting boards required by project conditions, Holiday Inn Hotel specification, wireless internet provider, and local telephone utility and/or television equipment supplier shall be provided. All lines concealed in walls or floor, etc, shall be run in conduit.

B. Minimum conduit sizes shall be 1/2" within guestrooms only. All other conduit shall be 1" or larger, as required. All homeruns shall be a minimum of 2". Pull strings shall be installed in all conduit for Owner's vendor installation. Should any conduit installed not be of sufficient size to provide for safe and smooth installation of all cable, the Contractor shall replace such conduit at no expense to the Owner.

C. Conduit must be installed within the guestroom, and from the IDF on each floor to the main PBX room. Upon approval from the vendor, owner, and if acceptable to the local AHJ, the conduit runs from the IDF to the vicinity of each guestroom may be eliminated. In this instance, this contractor shall install sleeves as needed by the communications vendor above the ceiling space for cabling installations.

3.02 UNDERGROUND CONDUIT

A. The conduit shall not have any 90 degree bends, but shall have sweeps at 45 degrees.

B. The conduit shall be glued at all connecting joints.

A. The conduit shall protrude approximately 8" above the building floor level.

D. All open ends shall be closed (taping is sufficient) so that foreign objects do not enter the conduit.

3.03 INTERMEDIATE DISTRIBUTION CLOSETS

A. Slot/sleeve system shall be located in places where pulling and termination will be accessible for easy installation of both horizontal and backbone cabling.

B. After installation of cabling by Owner's vendor, contractor shall install firestops in all slots and sleeves in accordance with all applicable building codes. Slots and sleeves shall in no case be left open after installation.

C. A minimum of three (3) four-inch sleeves shall be installed at each closet for backbone pathways.

D. A backboard of 3/4" plywood with a total area of 4' x 4' shall be installed on the wall in each distribution closet, at a location as coordinated with the vendor.

3.04 MEETING CONFIGURATION

A. In each room, a conduit system shall be installed to provide a pathway from each jack location to the termination equipment. The minimum size conduit shall be 3/4". For each meeting room or ballroom, a minimum of one (1) 1" conduit shall be installed as a homerun from the room to the termination point. The maximum distance from the point of connection within each room to the termination point shall not exceed 300 feet.

B. The installation shall meet and/or exceed all the regulations as stated in the TIA/EIA 568B Standards, as well as meet all local, city, county, and state installation and construction requirements.

C. Each faceplate shall have adequate locations for each insert used - voice, data, fiber (if required) and coax. Termination shall be in a six-way flush mounted faceplate.

3.05 LODGENET SYSTEM

A. One 2" diameter conduit for Lodgenet's exclusive use shall be provided from the headend rack location to the front desk area and Hotel Property Management System (PMS) area for gues-pay services.

B. One 3" conduit for Lodgenet's exclusive use shall be provided from the headend rack location to the satellite dish location (maximum 300 ft. distance from the headend) for Guest-Pay and Free-To-Guest Services.

C. One 3" conduit for Lodgenet's exclusive use shall be provided from the headend rack location to the antenna location on the roof.

D. One 2" conduit shall be installed from each distribution closet to the headend.

E. At the dish and satellite locations, conduits shall terminate into a 12x12x6 inch weatherproof box.

3.06 WIRELESS INTERNET

A. One 4” homerun conduit shall be provided from the main “PBX” room to each IDF as indicated on the drawings. Contractor shall provide junction boxes as indicated and pull strings in all conduits for installation of cabling and wireless access points by Owner’s vendor.

B. Wireless internet may be run without conduit, so long as this is coordinated with the vendor. It shall be assumed that the main run of 4” conduit to IDF, and once on each floor, the cabling may be run without conduit.

3.07 GROUNDING

A. Grounding shall meet the requirements of all local codes. In addition, telecommunications grounding shall conform to the minimum requirements of ANSI/TIA/EIA 607.

END OF SECTION

SECTION 16750

PUBLIC ADDRESS SYSTEM

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. The General Conditions, Instructions to Bidders, and all other general requirements of these specifications shall be considered a component part of this division of the specifications.

B. Bidders to this section shall review all other sections of these specifications. All items in other sections relating to this section are as binding on this bidder as if repeated herein.

1.02 SCOPE

A. This section includes the furnishing of all labor, materials, tools, supervision, equipment, and tests required for a complete operating sound system as herein specified or indicated on the drawings.

B. The sound reinforcing system shall provide for live and recorded program material originating at the outlets as indicated on the drawings.

C. It is the intent of these specifications to describe and provide for a complete sound system installation of top quality.

1.03 QUALIFICATIONS

A. Manufacturer: The Manufacturer shall be a nationally recognized company specializing in sound systems. The Manufacturer and service organization shall have a minimum of 5-years experience in the communications industry.

B. Installer: The installation organization shall be a company specializing in the installation sound systems. This organization shall have a minimum of 5-years experience with installation of projects of similar magnitude. Provide for the Owner's review a list of previously installed jobs of similar magnitude within this timeframe, and provide a minimum of one (1) such completed project for inspection before consideration for proposal. The decision of the Owner/Architect as to the capability of the contractor to successfully install, maintain, and complete this system shall be final.

1.04 SUBMITTALS

A. Contractor shall provide to the Architect/Owner for review a complete design of the Public Address System proposed, including, but not limited to: speaker locations, types and zones, equipment list and specifications sheets for all equipment, description of system operation and capabilities, and maintenance requirements.

1. Equipment list, itemizing major system components shall include:
    a. Audio amplifying and control equipment, including mixer, equalizer, electronic crossovers and power amplifiers.
    b. Loudspeakers including drivers with horns and enclosures for low frequency woofer loudspeakers.
    c. Equipment cabinet.
    d. Program sources such as cassette, compact disc players, and AM/FM tuners.
    e. Microphones and microphone accessories.

f. Each item of equipment to be listed with:
   i. Manufacturer & model number
   ii. Description
   iii. Quantity

B. Contractor shall obtain all permits and licenses required for this portion of the work, and shall provide copies to Architect/Owner prior to beginning the work.

PART 2 - PRODUCTS

2.01 GENERAL

A. All equipment shall be listed by UL and shall conform to the applicable provisions of the American Standard Association. All equipment shall be new.

B. This specification is set as a standard for a complete system to be furnished by the contractor. Equipment of alternate manufacturers may be approved by the Owner/Architect upon full submittal of all components. Obtain all approvals in writing from the Architect..

2.01 MATERIALS

A. Modular Mixer/Amplifier 1: The mixer amplifier shall be rack-mountable and have eight modular input channels and one dedicated program input. The master section shall include one master volume level control, two EQ controls providing 10dB of boost or cut at 100 Hz and 10kHz, a “contour” switch providing 6dB of boost at 100 Hz and 6dB of boost at 10kHz, and a green status LED. Internal muting shall be accomplished at the modular level by means of two dedicated mute lines. External muting shall be accomplished via screw terminals on the back panel. Provision for an external master volume control shall be made through barrier strip connections on the back panel. The unit shall be packaged in a rugged metal chassis 17” wide by 3.5” high by 15.5” deep. The unit shall operate from 120 volts AC, 60 Hz power. The internal amplifier shall be capable of delivering 75 watts RMS into 4 ohms and 8 ohms, as well as providing 25 volt and 70 volt line outputs. The unit shall be capable of delivering rated power from 20 Hz to 20kHz $\pm$1 dB into 4 ohms at its direct output at less than 0.5% distortion with system hum and noise at least 77 dB below rated output.

B. Telephone Input Module: The telephone input module shall have screw terminal connectors and a variable gain control. The frequency response shall be 20 Hz to 20 kHz, $\pm$1 dB. Input sensitivity shall be 110 mV minimum. Signal to noise ratio shall be greater than 80 dB, referenced to 100 mV output. Distortion (@ 1 kHz) shall be less than 0.02% at 100 mV output. Input impedance shall be 600 ohm transformer balanced. It shall have a selectable “mute master” or “mute slave” function with a mute slave attenuation of 60 dB.

C. Auxiliary Input Module: The auxiliary pre-amp module shall have screw terminal connectors and a variable gain control. The frequency response shall be 20Hz to 20Khz $\pm$ 0.5 dB. The signal-to-noise ratio shall be 90 dB. It shall have a “mute” function with a muting level of 60 dB. Input sensitivity shall be 100mV to 3.2 V.

D. Signal Generating Module: The signal generating module shall have screw terminal connectors and a variable output gain control. The module shall be capable of generating a 1kHz test tone, single chime, continuous chime, buzzer tone, or yelp tone. Tones shall be selectable via a double row jumper header. The maximum output level shall be 0.6V RMS (1.75 V peak-to-peak).

E. AM/FM Tuner: The AM/FM tuner shall be digital, with highly sensitive reception and stable

operation. It shall employ a quartz-locked, frequency synthesized digital tuning system with memory for 20 AM and 20 FM preset stations. Preset scan shall provide preset station tuning with a flashing display indicating the station number. Each memorized station shall be scanned for 5 seconds to allow an operator to make the desired selection. Two different scan levels shall be provided for searching only strong signals or all signals. It shall have simplified controls and include band selector, direct select, auto and manual tuning, up/down tuning, and station memory buttons with memo display. Digital frequency and station number shall also be shown on the multi-function display. Connections for 300 ohm FM antenna as well as an AM antenna shall be provided on the back of the unit.

F. FM Antenna Kit: The FM antenna shall be of twin dipole high gain design. It shall employ two (2) half-wave dipole elements mounted 90 degrees to each other for an omnidirectional reception pattern. The kit will include an antenna matching transformer, FM radio matching transformer, galvanized 3-foot tripod mount with 5-foot mast, a 100-foot, 75 ohm RG59U coaxial cable with “F” connectors, a 50-foot grounding cable, a grounding rod and surge suppressor.

2.03 BASIC SYSTEM COMPONENTS:

A. The basic system component list below is not intended to provide a complete listing of all components required for installation, but a standard for development of a complete parts list. Contractor shall include all components required for a complete installation

1.	Modular Mixer/Amplifier 1	Simplex 5100-9214 (with 5100-9182 rack ears)
2.	Telephone Input Module	Simplex 5100-9282
3.	Auxiliary Input Module	Simplex 5100-9271
4.	Signal Generating Module	Simplex 5100-9286
5.	AM/FM Tuner	Simplex 5100-9177
6.	FM Antenna Kit	Simplex 5100-9181
7.	Amplifier	Simplex 5100-9431, 800W (Peavey IPS-800)
8.	Automatch Transformer 70 volt	Simplex 5100-9491
9.	8" Coaxial Speaker, 70 volt	Atlas/Soundolier Model C803A
10.	Bi-Directional Corridor Baffle Enclosure	Atlas/Soundolier Model X8500-W
11.	Wall Mount Baffle Enclosure	Atlas/Soundolier Model X8609-W
12.	Ceiling or Pendant Baffle Enclosure	Atlas/Soundolier Model X8409-W
13.	Suspension Mounting Hanger	Atlas/Soundolier Series 435, length as required
14.	2' x 2' Drop-In Speakers	Atlas/Soundolier IS200 with
15.	Outside Pool Area Speaker	Atlas/Soundolier ATS183GS, 32 watt, 70 volt,

2.03 WIRING

A. The loudspeaker wiring shall be a minimum of 2 twisted conductors #12 AWG stranded, and if not required to be in a dedicated system conduit, these conductors shall be shielded.

B. The microphone outlets, as shown on project drawings shall each be wired as "home-runs" to the amplifier cabinet and shall be a minimum of 2 conductor #22 AWG shielded.

PART 3 - EXECUTION

3.01 SPEAKER LOCATIONS

A. Speakers shall be installed in all common areas on the first level, including corridors, lobbies, meeting rooms, lounge, pool area, food serving areas, vending areas, laundry, maintenance office, and registration desk. On the second floor and above(guestroom floors), speakers shall be installed on a separate zone, and shall be located in the corridors and vending and guest

laundry areas only. Speakers shall also be installed outside in the recreation areas of the pools.

B. Minimum speaker requirements

1. Guestroom Corridors: Background music shall be adjustable and able to sustain 5dB above ambient noise. Voice system announcements shall be provided at 10dB above ambient noise.
2. Lobby and Dining Area: Background music shall be adjustable and able to sustain 5dB above ambient noise. Voice system announcements shall be provided at 10dB above ambient noise.
3. Outside Patio and Pool Areas: Background music shall be adjustable and able to sustain 10dB above ambient noise. Voice system announcements shall be provided at 15dB above ambient noise. There shall be a minimum of four (4) speakers for each pool.
4. Meeting and Breakout Rooms: Background music shall be adjustable and able to sustain 5dB above ambient noise. Voice system announcements shall be provided at 10dB above ambient noise. These rooms shall be equipped with individual volume and shutoff control. Each meeting and breakout room shall have a minimum of one (1) speaker and one (1) control.
5. All other Common areas: Background music shall be adjustable and able to sustain 5dB above ambient noise. Voice system announcements shall be provided at 10dB above ambient noise.

3.02 INSTALLATION

A. Provide all equipment, wiring, conduit and outlet boxes required for the installation of a complete and operating system in accordance with applicable local, state and national codes, the manufacturers' recommendations, these plans and specifications. All circuits not in conduit must be wired with power limited or non-power limited cable as listed under NEC 725 Class II wiring. Color coded wires shall be used throughout. Wiring shall conform to the practices in the National Electrical Code.

B. Speakers shall be installed in a manner and location that provides the maximum sound efficiency while taking into full consideration the aesthetics of the area.

C. Speakers shall be specifically located in the following areas:

1. Lobby
2. Restaurant
3. Bar
4. Public Restrooms
5. Prefunction Area
6. Meeting Rooms
7. Board Room

D. Volume controls for lobby, bar, restaurant, and restrooms shall be located in the main registration desk area. Controls for meeting rooms and board rooms shall be located in each individual space.

E. Care shall be exercised to ensure that all speakers are properly phased and that polarity is observed in all amplifier circuitry.

F. Cable within equipment racks shall be routed in groups according to function, microphone, line-level, loud speaker and control circuits, etc. Cable shall be neatly arranged, using plastic cable ties for grouping of circuits.

G. All audio circuits shall be ungrounded, except where grounding of unbalanced circuits is directed during system tests.

H. The ground wires shall be connected to the power amplifier common sheet metal, not to the transformer isolated input circuits.

I. Provide all associated wiring for MUZAK interface.

J. Connections to screw-type terminals shall be made with mechanically-connected, un-insulated spade type lugs. Microphone circuit shields shall be grounded only at the console input terminations.

K. Notwithstanding the detailed information contained in this Specification, it is the responsibility of the Contractor to provide a complete and properly operating sound system.

3.03 INSPECTION AND TEST UPON COMPLETION

A. The manufacturers' authorized representative shall provide supervision of final system connections, perform a complete functional test of the system, and submit a written report to the Contractor attesting to satisfactory operation of the system. In addition on-site instruction shall be provided to the Owner's designated personnel.

B. All materials and installation shall be guaranteed to be free of defects in material and workmanship for one year after final acceptance of installation and test.

C. Upon completion of the installation, four (4) copies of complete operational instructions shall be furnished, complete with record drawings. Instructions shall include part numbers and names, addresses, and telephone numbers of parts source. Final payment shall not be made until operational and maintenance manuals have been received.

D. Final acceptance will be granted after completion of successful acceptance testing, presentation and submittal of instructions, and transmittal of Owner's & Service manuals.

E. Nothing herein contained shall be construed to relieve the Contractor from furnishing a complete and acceptable electrical wiring system in all its categories. Any materials or labor which are or may become detrimental to the accomplishment of the intents of these specifications will be rejected.

END OF SECTION