



Kontogiannis & Associates

Architecture



Planning



Design

TANNER'S CREEK MANOR
58 DOUGHTY ROAD
LAWRENCEBURG, INDIANA
47025

PROJECT
SPECIFICATIONS

JUNE 26, 2026

phone: 614.224.2083

fax: 614.224.4736

e-mail: architects@kontogiannis.com

400 south fifth street • suite 400 • columbus, ohio 43215-5492

TANNER'S CREEK MANOR

TABLE OF CONTENTS

June 26, 2026

CONDITIONS OF THE CONTRACT

Page #

Section	00 03 32	Soils Report	1-27
	00 72 00	General Conditions of the Contract for Construction (AIA General Conditions)	1-1

DIVISION 1 GENERAL REQUIREMENTS

Section	01 10 00	Summary	1-1
	01 30 00	Administrative Requirements	1-2
	01 40 00	Quality Requirements	1-4
	01 50 00	Temporary Facilities	1-1
	01 60 00	Product Requirements	1-1
	01 71 23	Field Engineering	1-2
	01 77 00	Close out Procedures	1-3
	01 81 13	Sustainable Design Requirements	1-3

DIVISION 2 EXISTING CONDITIONS

NONE

DIVISION 3 CONCRETE

Section	03 31 00	Concrete	1-9
	03 34 00	Lightweight Concrete Floor Fill	1-2

DIVISION 4 MASONRY

Section	04 22 00	Concrete Block	1-7
	04 70 10	Applied Stone Veneer	1-5

DIVISION 5 METALS

Section	05 12 00	Structural Steel	1-2
	05 52 00	Railings and Columns	1-3
	05 58 00	Miscellaneous Metals	1-1

DIVISION 6 WOOD, PLASTIC AND COMPOSITES

Section	06 11 00	Wood Framing	1-7
	06 16 00	Sheathing	1-4
	06 17 53(A)	Roof Trusses	1-4
	06 17 53(B)	Open Web Floor Trusses	1-3
	06 20 13	Exterior Finish Carpentry	1-2
	06 20 23	Interior Finish Carpentry	1-3
	06 43 00	Wood Stairs	1-1

DIVISION 7 THERMAL AND MOISTURE PROTECTION

Section	07 13 00	Waterproofing	1-2
	07 21 00	Insulation	1-2
	07 25 00	Weather Barrier	1-5
	07 31 13	Roof Shingles & Sheet Metal	1-4
	07 46 16	Fascia, Soffits, and Accessories	1-2
	07 46 23	Vinyl Siding, Trim & Shutters	1-2
	07 71 23	Gutters & Downspouts	1-2
	07 92 00	Caulking	1-3

DIVISION 8 OPENINGS

Section	08 14 00	Interior Doors	1-3
	08 16 13	Clad and Fiberglass Doors and Frames	1-3
	08 53 13	Single Hung Windows	1-3
	08 71 00	Finish Hardware	1-2

DIVISION 9 FINISHES

Section	09 29 00	Drywall	1-8
	09 65 16	Sheet Vinyl, Plank Flooring, VCT & Vinyl Base	1-4
	09 68 00	Carpeting	1-4
	09 91 00	Painting	1-6

DIVISION 10 SPECIALTIES

Section	10 28 16	Bath and Restroom Accessories	1-2
	10 55 13	Mailboxes	1-2
	10 57 23	Closet Shelving	1-2

DIVISION 11 EQUIPMENT

Section	11 31 00	Appliances	1-3
---------	----------	------------	-----

DIVISION 12 FURNISHINGS

Section	12 12 13	Blinds	1-2
	12 32 00	Cabinets and Countertops	1-4

DIVISION 13 SPECIAL CONSTRUCTION

NONE

DIVISION 14 CONVEYING SYSTEMS

Section	14 24 00	Electric Traction Elevator	1-8
---------	----------	----------------------------	-----

DIVISION 21 FIRE SUPPRESSION

Section	21 00 00	Fire Suppression Sprinkler System	1-2
---------	----------	-----------------------------------	-----

DIVISION 22 PLUMBING

Section	22 11 00	Water Supply System	1-9
	22 13 00	Sanitary System	1-8
	22 34 00	Domestic Water Heaters	1-3
	22 41 00	Plumbing Fixtures	1-3

DIVISION 23 HEATING, VENTILATION and AIR CONDITIONING

Section	23 31 00	Ductwork	1-6
	23 34 00	Fans	1-3
	23 37 00	Diffusers, Registers, Grilles & Fire Dampers	1-3
	23 70 00	HVAC Equipment	1-6

DIVISION 26 ELECTRICAL

Section	26 05 19	Wiring & Cabling	1-7
	26 24 00	Panels	1-4
	26 27 00	Electric Services & Metering	1-4
	26 27 26	Wiring Devices	1-4
	26 50 00	Lighting	1-3
	26 56 29	Site Lighting & Distribution	1-2

DIVISION 27 COMMUNICATIONS

Section	27 10 00	Telephone, TV Cable & High-Speed Internet	1-4
---------	----------	---	-----

DIVISION 28 ELECTRONIC SAFETY & SECURITY

Section	28 31 00	Fire Alarm System	1-10
	28 31 43	Fire Detection Units	1-2

DIVISION 31 EARTH WORK

Section	31 22 00	Earthwork	1-5
	31 31 00	Soil Treatment	1-2

DIVISION 32 EXTERIOR IMPROVEMENTS

Section	32 12 00	Flexible Paving	1-4
	32 16 00	Site Concrete	1-8
	32 91 00	Topsoil	1-2
	32 92 00	Lawn & Grasses	1-3
	32 93 00	Trees, Plants & Ground Cover	1-5

**SUBSURFACE INVESTIGATION &
GEOTECHNICAL RECOMMENDATIONS**

**TANNER'S CREEK MANOR
58 DOUGHTY ROAD
LAWRENCEBURG, INDIANA
ALT & WITZIG ENGINEERING PROJECT No.: 25CN0405**

**PREPARED FOR:
SPIRE DEVELOPMENT, INC.
330 W. SPRING STREET, SUITE 430
COLUMBUS, OH 43215**

**PREPARED BY:
ALT & WITZIG ENGINEERING, INC.
GEOTECHNICAL DIVISION
HEBRON, KENTUCKY**

JANUARY 16, 2026



Alt & Witzig Engineering, Inc.

1020 Arbor Tech Drive • Hebron, Kentucky 41048

Phone: (859)551-4944 • www.altwitzig.com

January 16, 2026

Spire Development, Inc.
330 W. Spring Street, Suite 430
Columbus, Ohio 43215
Attention: Mr. Scott Harold

Report of Subsurface Investigation and Geotechnical Recommendations

RE: Tanner's Creek Manor
58 Doughty Road
Lawrenceburg, Indiana
Alt & Witzig Engineering Project No.: 25CN0405

Mr. Harold:

In compliance with your request, Alt & Witzig Engineering, Inc. has completed a subsurface investigation for the above-mentioned Site. The Statement of Objectives, Scope of Work, and results of our investigation are presented in the following report

The results of our test borings and laboratory tests completed to date are presented in the appendix of the report. Recommendations for the project are presented in the "Geotechnical Analyses and Recommendations" section of the report. If you have any questions or comments regarding this matter, please contact us at your convenience.

Sincerely,
Alt & Witzig Engineering, Inc.

Benjamin E. Armstrong, P.E.
Project Engineer

Patrick A. Knoll, P.E.
Principal Engineer



TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1.0 INTRODUCTION	2
1.1 Purpose	2
1.2 Statement of Objectives	2
1.3 Incorporations by Reference	2
1.4 Report Reliance	2
2.0 BACKGROUND INFORMATION.....	3
2.1 Site Location	3
2.2 Site Description	3
2.3 General Site Geology	3
3.0 WORK PERFORMED	4
3.1 Boring Locations	4
3.2 Soil Sampling.....	4
3.2.1 Laboratory Analyses for Soil Samples.....	5
3.3 Groundwater Elevation	5
3.4 Ground Surface Elevation	5
4.0 INVESTIGATION RESULTS	5
4.1 Subsurface Conditions.....	5
4.2 Water Observations	6
4.3 Seismic Parameters	6
5.0 GEOTECHNICAL ANALYSES AND RECOMMENDATIONS	7
5.1 Project Description	7
5.2 Bulk Earthwork	8
5.3 Foundation Recommendations.....	9
5.4 Retaining Wall Discussion	10
5.5 Floor Slab Recommendations	10
5.6 Groundwater Considerations	11
5.7 Utility Excavations.....	11
6.0 STATEMENT OF LIMITATIONS.....	12
APPENDIX	
Site Location Map	
Boring Location Plan	
Boring Logs	
General Notes	

EXECUTIVE SUMMARY

Alt & Witzig Engineering, Inc. has performed a subsurface investigation and geotechnical analysis for the proposed development to be constructed at 58 Doughty Road in Lawrenceburg, Indiana, in conformance with the scope and limitations of the proposal dated November 25, 2025 (*Alt & Witzig Engineering Proposal 2511CN035*). This investigation was performed for Spire Development, Inc.. Authorization to perform this investigation was in the form of an Alt & Witzig Engineering proposal accepted by Mr. Scott Harold of Spire Development, Inc. and an executed agreement.

In compliance with your original request, a total of 8-soil borings were completed at the above referenced site for the proposed development. The purpose of this investigation was to determine the various soil profile components, the engineering characteristics of the subsurface materials and to provide geotechnical recommendations for use in design of the proposed project.

Based on the investigation, the following conditions and concerns are relevant for this project:

- A grading plan had not been prepared at the time of this investigation. **Desired grading conditions must be reviewed by Alt & Witzig to affirm or modify the recommendations made in this report.** Significant portions of the soils tested at the boring locations are classified as colluvium. Colluvial soils are common on hillsides and are innately more unstable than other native soil types. The preliminary site concept indicates multiple cuts into the existing hillside will be required to construct site retaining walls. **A review of the grading is required prior to design of these walls as the wall type may be dependent upon these conditions. Additional geotechnical exploration and analysis may be required as a result to finalize desired grading details and retaining wall design parameters.** Top-down constructed walls such as a pier and plug wall could be required to protect the existing slope throughout construction.
- Undocumented fill soils were recorded at borings B-01, B-02, and B-04 to depths ranging between 3 and 6.5-feet beneath existing grades. These materials soils are unsuitable for foundation and slab support. During the bulk earthwork phase of the project, these materials should be over-excavated and replaced with documented structural fills in all instances inside the building footprint and up to 5-feet beyond the building footprint as well as any areas where new retaining walls are proposed.
- Conventional foundations appear feasible for building support provided that the new foundations extend through any undocumented fill material. A net allowable bearing pressure of 2,500-psf can be used for dimensioning foundations bearing immediately upon stiff, native materials or documented structural fills. All exterior foundations should be founded a minimum of 30-inches or greater below the finished grade to reduce frost action.

1.0 INTRODUCTION

1.1 Purpose

The purpose of this investigation was to determine the various soil profile components, the engineering characteristics of the subsurface materials, and to provide geotechnical recommendations for use in the design and construction of building foundations and ancillary structure design.

1.2 Statement of Objectives

In compliance with your request, a total of 8-soil borings were completed at the above referenced site for the proposed development in Lawrenceburg, Indiana.

This project included:

- A review of geological maps of the area and review of geologic and related literature
- A reconnaissance of the immediate site and subsurface exploration
- Field and laboratory testing
- Engineering analysis and evaluation of the materials

1.3 Incorporations by Reference

The subsurface investigation was conducted in accordance with guidelines set forth in the scope of services and applicable industry standards. This investigation was performed for Spire Development, Inc. The proposed statement of objectives and scope of work were outlined in the form of *Alt & Witzig Engineering Proposal Number 2511CN035* duly authorized by Mr. Scott Harold of Spire Development, Inc..

1.4 Report Reliance

This report is solely for the use of Spire Development, Inc. and any reliance of this report by third parties shall be at such party's sole risk and may not contain sufficient information for purposes of other parties for other uses. This report shall only be presented in full and may not be used to support any other objectives than those set out in the scope of work, except where written approval and consent are provided by Spire Development, Inc. and Alt & Witzig Engineering.

2.0 BACKGROUND INFORMATION

2.1 Site Location

The site is located at 58 Doughty Road in Lawrenceburg, Indiana. The location of the site (filled in red) is shown on the enclosed *Site Location Map* presented in the *Appendix* and in *Figure 1*.



Figure 1: Site Location (Filled in Red)

2.2 Site Description

At the time of this investigation, the site was occupied by a mixture of maintained grass, brush, trees, and a single standing storage structure in the middle. The site is moderately sloped, with elevations at boring locations ranging from 533 to 497-feet AMSL. The surrounding properties consist mainly of residential and commercial use structures. Historical aerial photographs indicate that a house used to stand where boring B-1 is located.

2.3 General Site Geology

The site lies within the Dearborn Upland Physiographic Region of the State of Indiana. Typical soil makeup consists of silty clay loam parented by clayey residuum over shale and limestone. Slopes typically range from 12 to 18% grade. Bedrock in this area is representative of the Ordovician aged Kope Formation. This formation consists of interbedded shale (75%) and limestone (25%). It is not uncommon for areas overlaying the Kope Formation to be subject to mild to severe landslides, due to the ease at which colluvium forms out of the parent rock. The shale that makes up this formation is weakly cemented, causing it to easily break apart.

3.0 WORK PERFORMED

3.1 Boring Locations

Alt & Witzig Engineering staked the locations of the soil borings using the provided project documents and available information from Google Earth. The soil boring locations were overlain on available imagery from Google Earth and can be reviewed on the *Boring Location Plan* found in the appendix of this report and in *Figure 2*. The borings should be field located by the survey/site engineer and shown on the proposed site layout and grading plan.



Figure 2: 2025 Google Earth Aerial - Boring Locations over Existing Conditions

3.2 Soil Sampling

The field investigation included a reconnaissance of the project site and completion of 8-soil borings. The soil borings were performed with a track-mounted drilling rig equipped with a rotary head. Conventional hollow-stem augers were used to advance the holes. During the sampling procedure, standard penetration tests were performed at regular intervals in accordance with ASTM Method D1586 to obtain the standard penetration value (N) of the soil. The standard penetration value is defined as the number of blows a 140-lb hammer, falling 30-inches, required to advance the split-spoon sampler 12-inches into the soil. The results of the standard penetration tests indicate the relative density and comparative consistency of the soils and thereby provide a basis for estimating the relative strength and compressibility of the soil profile components.

Soil samples from the split spoons were field classified and placed in unpreserved glass jars with Teflon-lined lids for transport to our geotechnical laboratory for further analysis.

3.2.1 Laboratory Analyses for Soil Samples

A supplementary laboratory investigation was conducted to ascertain additional pertinent engineering characteristics of the subsurface materials necessary in analyzing the behavior of the proposed structures. All phases of the laboratory investigation were conducted in general accordance with applicable ASTM Specifications.

The laboratory-testing program included:

- Visual classification in accordance with ASTM D 2488.
- Moisture content tests in accordance with ASTM D 2216.
- Atterberg limit testing in accordance with ASTM D 4318.

Samples of the cohesive soil from the split-spoon-sampling device were frequently tested in unconfined compression by use of a calibrated spring testing machine. In addition, a calibrated soil penetrometer was used as an aid in determining the strength of the soil. The unconfined compressive strength as determined on soil samples from the split-spoon sampling are approximate values since the split-spoon sampling techniques provide a representative but somewhat disturbed soil sample.

3.3 Groundwater Elevation

Initial depths to groundwater were estimated based on where water was observed on the sampling rods. Upon completion of drilling activities, the depth to water was measured using a 100-foot tape measure with a weighted end. The depths presented on the *Boring Logs* are accurate only for the day on which they were recorded. The exact location of the water table shall be anticipated to fluctuate depending upon normal seasonal variations in preparation and surface runoff.

3.4 Ground Surface Elevation

Ground surface elevations have been **estimated** using available information from Google Earth. The project surveyor should capture the existing elevations at the boring locations and provide this data to Alt & Witzig to revise the boring logs.

4.0 INVESTIGATION RESULTS

The types of subsurface materials encountered have been visually classified and are described in detail on the *Boring Logs*. The results of the field penetration tests, strength tests, water level observations and laboratory water contents are presented on the *Boring Logs* in numerical form. Representative samples of the soils encountered in the field were placed in sample jars and are now stored in our laboratory for further analysis if desired. Unless notified to the contrary, all samples will be disposed of after 30 days.

4.1 Subsurface Conditions

A total of 8-soil borings were completed across the site for the proposed multi-family structure. Field measurements of topsoil thicknesses ranged between 2 and 12-inches. Undocumented fill soils were encountered at borings B-01, B-02, and B-04 to depths ranging between 3 and 6.5-feet beneath existing grades. The existing fill materials are characterized as dark brown to brown and gray clays with varying amounts of silt, sand, gravel, organics, and traces of brick and ash.

Colluvium (material that has weathered in-situ and shifted, either through slope creep or complete failure) was encountered at borings B-04 and B-05, at depths of 6.5 to 13.5-feet and 3.5 to 6.0-feet below existing grades. Native materials obtained at the boring locations are classified as soils consisting of a mixture of brown and gray clays with varying amounts of sand, silt, and gravel.

Bedrock consisting of brown and gray highly weathered shale was encountered at borings B-1, B-2, B-3, and B-8, at depths ranging from 9 to 21-feet beneath existing grades. The following chart summarizes the subsurface conditions encountered at each boring location:

Boring	Topsoil (in)	Gravel (in)	Existing Fill Depths (ft)	Colluvium Depth (ft)	Bedrock Depth (ft)	Auger Refusal Depth (ft)
B-01	12.0	-	6.0	-	21.0	23.9
B-02	4.0	8.0	3.0	-	19.0	-
B-03	2.0	24.0	-	-	18.0	18.9
B-04	6.0	-	6.5	13.0	-	13.0
B-05	7.0	-	-	6.0	-	-
B-06	5.0	-	-	-	-	-
B-07	5.0	-	-	-	-	7.3
B-08	5.0	-	6.5	-	-	-

4.2 Water Observations

Groundwater was not observed during drilling operations. However, water levels upon completion were recorded at borings B-1 and B-3, at depths of 23.5 and 18.5-feet, respectively. The exact elevation of the water table will fluctuate depending upon normal seasonal variations in precipitation and surface runoff. It is anticipated that the groundwater table exists near the transition between the clay and bedrock boundary and that pockets of groundwater are trapped within the existing fill materials. The exact level of the water table should be expected to fluctuate based on seasonal variations.

4.3 Seismic Parameters

An evaluation of the seismic site class has been performed for this site. The Indiana Building Code indicates that the seismic site class is determined by averaging soil conditions within the top 100-feet with respect to the shear wave velocity. This evaluation is based on data obtained on soil to termination of the borings and our knowledge of soils in the area. Based on the field and laboratory tests performed on the encountered subsurface materials to boring termination, this site should be considered a Site Class C in accordance with the current Indiana Building Code. Seismic acceleration parameters of $S_s=0.149g$ and $S_1=0.079g$ can be utilized for design, assuming the building has risk category of 1, 2, or 3.

5.0 GEOTECHNICAL ANALYSES AND RECOMMENDATIONS

5.1 Project Description

Preliminary project documents indicate that a 4-story multi-family residential building, retaining walls, with surface parking and associated drives will be constructed. Multiple retaining walls will be constructed to facilitate surface parking and ramp walkways. This will include the demolition of the existing onsite standing structure.

A grading plan had not been prepared at the time of this investigation. **Desired grading conditions must be reviewed by Alt & Witzig to affirm or modify the recommendations made in this report. Additional geotechnical exploration and analysis may be required as a result to finalize desired grading details and retaining wall design parameters.** Finished slopes steeper than 3H:1V should not be considered for this project. Significant portions of the soils tested at the boring locations are classified as colluvium. Colluvial soils are common on hillsides and are innately more unstable than other native soil types. The preliminary site concept indicates multiple cuts into the existing hillside will be required to construct site retaining walls. A review of the grading is required prior to design of these walls as the wall type may be dependent upon these conditions. Top-down constructed walls such as a pier and plug wall may be required to protect the existing slope throughout construction.

The following figure shows the approximate locations for the retaining walls.



Figure 4: Locations of Retaining Walls Over Site Plan and Existing Conditions

5.2 Bulk Earthwork

Topsoil thicknesses at the boring locations measured between 2 and 12-inches. Undocumented fill soils were recorded at borings B-01, B-02, and B-04 to depths ranging between 3 and 6.5-feet beneath existing grades. These materials soils are unsuitable for foundation and slab support. During the bulk earthwork phase of the project, these materials should be over-excavated and replaced with documented structural fills in all instances inside the building footprint and up to 5-feet beyond the building footprint as well as any areas where new retaining walls are proposed.

After the above-mentioned stripping and existing fill removal has been performed, the exposed subgrade should be proofrolled with approved equipment to identify soft or yielding soils. Any soft or unsuitable soils should be removed and replaced with a well-compacted material. It is recommended that a representative of Alt & Witzig Engineering, Inc. be present for this phase of this project. After the existing subgrade soils are excavated to design grade, proper control of subgrade compaction and fill, and structural fill replacement should be maintained by a representative of the soils engineer. This will minimize volume changes and differential settlements which are detrimental to behavior of shallow foundations, floor slabs and pavements. The following table illustrates the recommended compaction percentage in several areas of the site:

Area	Percentage of Compaction ASTM D698	Acceptable Material*	Typical Maximum Lift Thickness
Roads, Drives, & Parking Areas (including future areas)	98%	Any besides ML, MH, CH, OL, OH	8”
Under Foundations and Footings	98%	Any besides ML, MH, CH, OL, OH	8”
Sub grade Below Slab-On-Grade	98%	Dense grade crushed stone or other coarse-grained material	8”
Lower-Level Walls	98%	Clean, GW or SW containing less than 5 percent fines by weight, approved by geotechnical engineer.	8”
Construction of Permanent Slopes	98%	Any* besides ML, MH, CH, OL, OH	8”
Green Space (not including permanent slopes)	85%	Any	12”
Landscaped Areas	Maximum 90%	Any	12”
Trench Backfill within Buildings and Pavement Areas	98%	GW, GP, SW, SP	8”
USCS Classifications: GW-Well Graded Gravel GP-Poorly Graded Gravel GM-Silty Gravel GC-Clayey Gravel	SW-Well Graded Sand SP-Poorly Graded Sand SM-Silty Sand SC-Clayey Sand CL-Lean Clay	ML-Silt CH-Fat Clay MH-Elastic Silt OL-Organic Clay/Silt OH-Organic Clay/Silt	

Excluding organics and any undocumented fill with high contents of construction debris, the on-site soils observed in the borings are suitable for reuse as structural fill. The laboratory tests indicated that the soils have moisture contents ranging between 9% and 33% with an average of 21%. Optimum moisture content for the clay soils is anticipated to be in the range of 16% to 21% based on experience with similar soils. Proper moisture content must be maintained for these soils to be used as structural fill.

Based on moisture contents of the boring samples, portions of the shallow soils appear to be above optimum moisture content. Moisture conditioning of the cut soils to be used as structural fill will be required. This can be accomplished by spreading the soils in a thin (approximately 8-inches) loose lift in favorable weather conditions and continuously disking the soils until a suitable moisture content is reached. Alternatively, chemical drying can be performed by mixing very moist to wet soils with approximately 3% lime kiln dust per dry soil weight.

All fills should be formed from material free of vegetable matter, rubbish, rock larger than 12-inches in plane and 4-inches in depth, and other deleterious material. Prior to placement of fill, a sample of the proposed fill material should be submitted to Alt & Witzig Engineering for approval. The fill material should be placed in layers not to exceed the loose thickness mentioned in the chart above. Each layer should be uniformly compacted by means of suitable equipment of the type required by the materials composing the fill.

5.3 Foundation Recommendations

Undocumented fill soils were encountered at borings B-01, B-02, and B-04 to depths ranging between 3 and 6.5-feet beneath existing grades. Existing fill soils are unsuitable for foundation support and should be remediated as outlined in the *Bulk Earthwork* section of this report. A grading plan has not been prepared at the time of this investigation. **Once a grading plan has been prepared, a copy must be provided to Alt & Witzig to determine if modifications to this report are necessary.** The following table can be utilized to dimension foundations that extend through any undocumented fill soils and are immediately supported by suitable native materials or documented structural fills:

	Footing Type	
	Continuous Footings	Spread Footings
Net Allowable Bearing Pressure*	2,500-psf	2,500-psf
Minimum Frost Protection Depth	30-inches	30-inches
Estimated Maximum Total Settlement	1-inch	1-inch
Estimated Maximum Differential Settlement	½-inch	½ -inch

*Note - In utilizing a net allowable bearing pressure, it is only necessary to account for structural loads applied above finished floor elevation.

The above recommended bearing pressures are "net allowable soil pressures". In utilizing these net allowable pressures for dimensioning footings, it is necessary to consider only those loads applied above the finished floor elevations.

All foundation excavations should be inspected by Alt & Witzig personnel prior to placement of foundation reinforcement and concrete. Soils deemed unsuitable for foundation support such as organics, undocumented fills, highly plastic soils will be over-excavated until suitable conditions are achieved. The over-excavated areas should be backfilled with lean concrete (min. compressive strength of 1,500-psi). All exterior foundations should be found a minimum of 30-inches below the finished grades to reduce frost action. *Figure 5* depicts a typical undercut replaced with lean concrete.

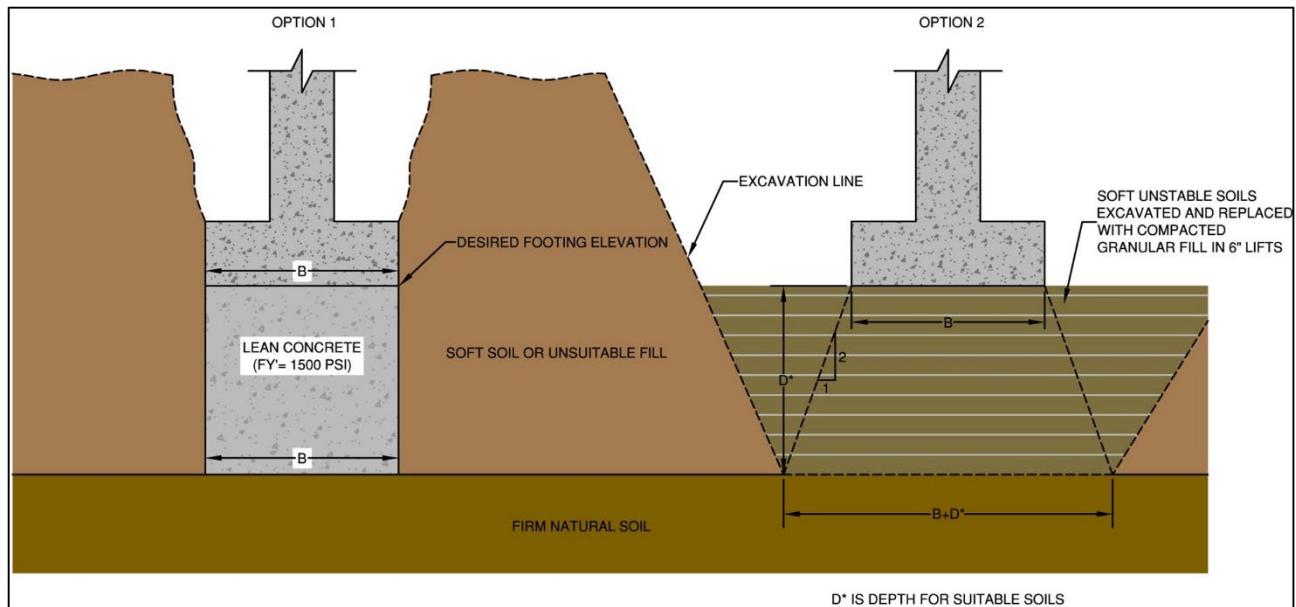


Figure 5: Example of Undercut Soils Replaced with Lean Concrete or Suitable Structural Fill

5.4 Retaining Wall Discussion

Construction will include excavations and installation of several retaining walls. Due to the elevated risk of landslides and instability of the existing slope, ramp retaining walls in the form of pier and plug walls could be required. A pier and plug wall utilizes structural piers consisting of reinforced concrete that are separated by plug piers. The structural piers extend to design depths and the plug piers need only extend 1 to 2-feet beyond the failure surface. Prior to making any cuts along the hillside, this slope should be filled and buttressed to allow for access of the pier installation equipment. Once the wall has been installed, the excavations down slope can commence. **Once a grading plan has been provided, Alt & Witzig can provide more detailed recommendations for wall construction. Additional geotechnical exploration and analysis may be required as a result to finalize retaining wall design parameters.**

5.5 Floor Slab Recommendations

Undocumented fill soils were encountered at borings B-01, B-02, and B-04 to depths ranging between 3 and 6.5-feet beneath existing grades. These materials are not suitable for slab support and should be remediated during the bulk earthwork phase of the development as outlined in the *Bulk Earthwork* section of this report. After the building area has been cut to the proper elevation, a minimum of at least 4-inches of compacted dense grade limestone should be placed beneath the floor slabs.

This compacted granular fill will provide a uniform surface for construction of the slab and minimize capillary rise of groundwater from the subgrade into the slab. A vapor barrier should be placed immediately below the floor slab in any areas of the building where floor coverings such as carpet, vinyl tile, ceramic tile, etc. will be placed.

5.6 Groundwater Considerations

Groundwater was not observed during drilling operations. However, water levels upon completion were recorded at borings B-1 and B-3, at depths of 23.5 and 18.5-feet, respectively. The exact elevation of the water table will fluctuate depending upon normal seasonal variations in precipitation and surface runoff. Groundwater is anticipated to be encountered at the interface between soil and bedrock.

Based on observations from the borings, groundwater concerns with short term excavations should not present major difficulties; however, groundwater seepage may occur depending upon the time of the year and the weather conditions when the excavations are made. Excavations should be frequently monitored for groundwater seepage. Flattening of excavations could be required if softening of the excavation sides occurs due to groundwater seepage and/or runoff. Groundwater is anticipated to be encountered at the interface between soil and bedrock.

Seepage from surface runoff may occur into shallow excavations and soften the subgrade soils. Since these foundation materials tend to loosen when exposed to free water, every effort should be made to keep the excavations dry should water be encountered. Sump pumps or other conventional dewatering procedures should be sufficient for this purpose. All concrete for footings be poured the same day as the excavation is made to prevent the softening of foundation soils.

5.7 Utility Excavations

With construction of the new residential building, placement of numerous underground structures will be required. **As previously indicated, a grading plan review is required to determine if additional recommendations are required.** The shallow soils encountered at the site are classified as Type C soils in OSHA Construction Standards for Excavations. Therefore, it will be necessary to maintain all construction slopes greater than 4 feet at 1H:1V or flatter. Flatter excavations may be required due to colluvial soils and desired grading conditions. If it is not possible to maintain this slope, shoring will be required. All shoring should be in accordance with applicable OSHA standards. It should be noted that the shallow soils are susceptible to erosion. Thus, the amount of time which excavations are left open and unprotected should be very limited. Note also that excavations greater than 20-feet in depth are required to be designed by a professional engineer.

Groundwater seepage through the undocumented fill soils observed in the borings may occur depending on the time of construction. As mentioned above, excavations should be frequently monitored for changes in conditions due to exposure to water.

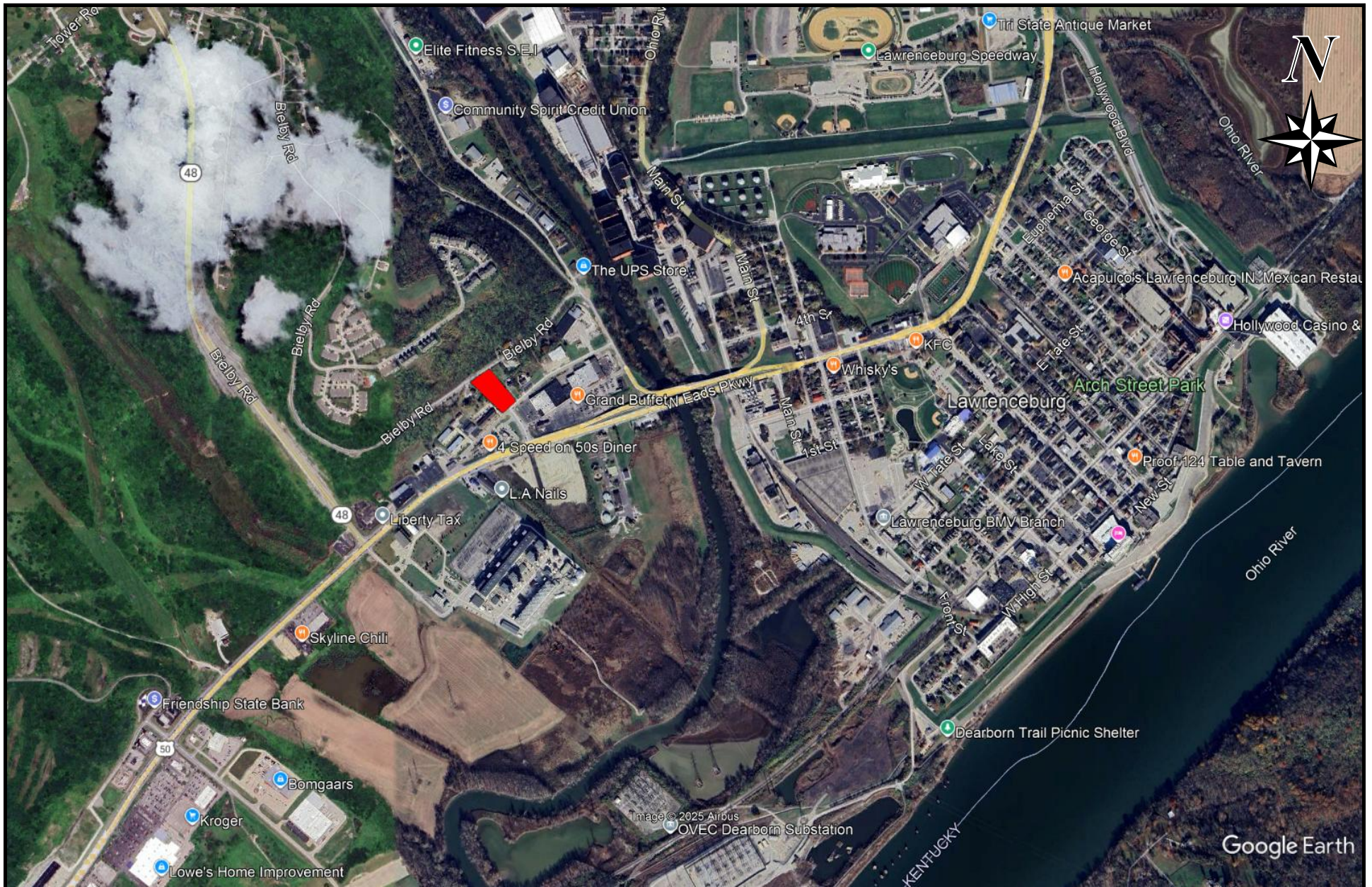
6.0 STATEMENT OF LIMITATIONS

An inherent limitation of any geotechnical engineering study is that conclusions must be drawn on the basis of data collected at a limited number of discrete locations. The geotechnical parameters provided in this report were developed from the information obtained from the test borings that depict subsurface conditions only at these specific locations and on the particular date indicated on the boring logs. Soil conditions at other locations may differ from conditions encountered at these boring locations and groundwater levels shall be expected to vary with time. The nature and extent of variations between the borings may not become evident until the course of construction.

The recommendations submitted are based on the available soil information and assumed design details enumerated in this report. If actual design details differ from those specified in this report, this information should be brought to the attention of Alt & Witzig Engineering, Inc. so that it may be determined if changes in the recommendations herein are required. If deviations from the noted subsurface conditions are encountered during construction, they should also be brought to the attention of Alt & Witzig Engineering, Inc.

Alt & Witzig Engineering, INC.

APPENDIX A
Site Location Map
Boring Location Plan
Boring Logs
General Notes



PROJECT: Tanner's Creek Manor
LOCATION: Lawrenceburg, Indiana
CLIENT: Spire Development, Inc.
ALT & WITZIG ENGINEERING FILE NO.: 25CN0405

SITE LOCATION MAP

Alt & Witzig Engineering, Inc.
 1020 Arbor Tech Drive Suite J
 Hebron, KY 41048
 TEL (859)551-4944 · www.altwitzig.com



PROJECT: Tanner's Creek Manor
LOCATION: Lawrenceburg, Indiana
CLIENT: Spire Development, Inc.
ALT & WITZIG ENGINEERING FILE NO.: 25CN0405

BORING LOCATION PLAN

Alt & Witzig Engineering, Inc.
1020 Arbor Tech Drive Suite J
Hebron, KY 41048
TEL (859)551-4944 · www.altwitzig.com



BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Spire Development, Inc.**
PROJECT NAME **Tanner's Creek Manor**
PROJECT LOCATION **Lawrenceburg, Indiana**

BORING # **B-01**
ALT & WITZIG FILE # **25CN0405**

DRILLING and SAMPLING INFORMATION

Date Started **12/4/25** Hammer Wt. **140** lbs.
Date Completed **12/4/25** Hammer Drop **30** in.
Boring Method **HSA** Spoon Sampler OD **2** in.
Driller **STRATA** Rig Type **D-50 Track ATV**

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-1sf Unconfined Compressive Strength	PP-1sf Pocket Penetrometer	Moisture Content % Dry Unit Weight (pcf)	Remarks
	SURFACE ELEVATION 503.0											
502.0	TOPSOIL (12-inches)	1.0		1	SS			16		2.0	28.9	
499.0	Gray and Brown CLAY with Trace Organics (FILL)	4.0		2	SS			10		3.0	21.8	
497.0	Brown CLAY with Trace Sand and Trace Gravel (Possible Fill)	6.0	5	3	SS			16		3.5	20.4	
	Brown and Gray CLAY with Gravel	10		4	SS			18		4.5	16.1	
489.5	Brown CLAY	13.5	15	5	SS			20		3.8	19.8	
482.0		21.0	20	6	SS			24		4.5	20.9	
479.1	Gray Highly Weathered SHALE	23.9		7	SS			50/5		2.3	13.9	
	(Auger Refusal @ 23.9-feet) End of Boring at 23.9 feet											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

○ During Drilling Dry ft.
▽ At Completion 23.5 ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling



BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Spire Development, Inc.**
PROJECT NAME **Tanner's Creek Manor**
PROJECT LOCATION **Lawrenceburg, Indiana**

BORING # **B-02**
ALT & WITZIG FILE # **25CN0405**

DRILLING and SAMPLING INFORMATION

Date Started **12/5/25** Hammer Wt. **140** lbs.
Date Completed **12/5/25** Hammer Drop **30** in.
Boring Method **HSA** Spoon Sampler OD **2** in.
Driller **STRATA** Rig Type **D-50 Track ATV**

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu- <i>tsf</i> Unconfined Compressive Strength	PP- <i>tsf</i> Pocket Penetrometer	Moisture Content % Dry Unit Weight (<i>pcf</i>)	Remarks
	SURFACE ELEVATION 513.0											
512.7	TOPSOIL	0.3										
512.0	(4-inches)	1.0		1	SS			5		3.0	9.5	
	Gravel											
	(8-inches)											
510.0	Brown Sandy CLAY with Gravel and Asphalt (FILL)	3.0		2	SS			11		2.8	20.4	
			5									
	Brown and Gray CLAY with Trace Sand			3	SS			14		3.5	20.4	LL = 45% PL = 18% PI = 27%
505.0		8.0		4	SS			14		4.5	17.8	
			10									
	Brown and Gray CLAY with Gravel and Sand											
500.0		13.0		5	SS			22		4.5	21.6	
			15									
	Brown and Gray CLAY with Gravel											
494.0		19.0		6	SS			39		4.5	18.0	
493.0		20.0										
	Brown and Gray Completely to Highly Weathered SHALE with Clay		20									
	End of Boring at 20 feet											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

○ During Drilling Dry ft.
⚡ At Completion Dry ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling



BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT Spire Development, Inc.
PROJECT NAME Tanner's Creek Manor
PROJECT LOCATION Lawrenceburg, Indiana

BORING # B-03
ALT & WITZIG FILE # 25CN0405

DRILLING and SAMPLING INFORMATION

Date Started 12/5/25 Hammer Wt. 140 lbs.
Date Completed 12/5/25 Hammer Drop 30 in.
Boring Method HSA Spoon Sampler OD 2 in.
Driller STRATA Rig Type D-50 Track ATV

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % Dry Unit Weight (pcf)	Remarks
	SURFACE ELEVATION 513.0											
512.8	TOPSOIL (2-inches)	0.2										
511.0	Gravel with Ash	2.0		1	SS			5		4.5	24.7	
	Brown and Gray CLAY with Silt, Some Sand, and Trace Roots			2	SS			10		3.5	22.2	
507.0		6.0	5									
	Brown and Gray CLAY with Sand and Gravel			3	SS			16		1.3	22.0	
504.0		9.0		4	SS			22		4.5	19.8	
	Brown and Gray Residual CLAY											
			10									
				5	SS			22		4.5	19.8	
			15									
495.0		18.0										
494.1	Brown and Gray Highly Weathered SHALE	18.9		6	SS			50/5		4.5	21.2	
	(Auger Refusal @ 18.9-feet) End of Boring at 18.9 feet											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

○ During Drilling Dry ft.
▽ At Completion 18.5 ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling



BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT Spire Development, Inc.
PROJECT NAME Tanner's Creek Manor
PROJECT LOCATION Lawrenceburg, Indiana

BORING # B-04
ALT & WITZIG FILE # 25CN0405

DRILLING and SAMPLING INFORMATION

Date Started 12/5/25 Hammer Wt. 140 lbs.
Date Completed 12/5/25 Hammer Drop 30 in.
Boring Method HSA Spoon Sampler OD 2 in.
Driller STRATA Rig Type D-50 Track ATV

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % Dry Unit Weight (pcf)	Remarks
	SURFACE ELEVATION 510.0											
509.5	TOPSOIL (6-inches)	0.5		1	SS			14		1.3	33.1	
	Gray Silty CLAY with Trace Organics (FILL)			2	SS			43		4.5	18.3	
505.5		4.5	5									
503.5	Olive Brown and Gray CLAY with Trace Organics and Brick (FILL)	6.5		3	SS			26		4.5	15.3	
				4	SS			9		4.3	19.6	
	Brown and Gray CLAY with Trace Organics and Gravel (Colluvium)		10									
497.0		13.0		5	SS			50/0				
	(Auger Refusal @ 13-feet) End of Boring at 13 feet											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

○ During Drilling Dry ft.
⚡ At Completion Dry ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling



BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT Spire Development, Inc.
PROJECT NAME Tanner's Creek Manor
PROJECT LOCATION Lawrenceburg, Indiana

BORING # B-05
ALT & WITZIG FILE # 25CN0405

DRILLING and SAMPLING INFORMATION

Date Started 12/4/25 Hammer Wt. 140 lbs.
Date Completed 12/4/25 Hammer Drop 30 in.
Boring Method HSA Spoon Sampler OD 2 in.
Driller STRATA Rig Type D-50 Track ATV

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % Dry Unit Weight (pcf)	Remarks
	SURFACE ELEVATION 497.0											
496.4	TOPSOIL (7-inches)	0.6		1	SS			5		1.8	24.9	
	Brown CLAY											
493.5		3.5		2	SS			14		4.5	17.6	
	Brown and Gray CLAY with Gravel and Sand (Colluvium)		5									
491.0		6.0		3	SS			17		4.5	20.8	
490.0	Brown and Gray CLAY with Trace Gravel	7.0										
489.0	Dark Brown CLAY	8.0		4	SS			21		4.5	21.9	
			10									
	Brown and Gray CLAY with a Trace of Sand											
483.0		14.0		5	SS			27		4.5	15.7	
			15									
	Brown and Gray CLAY with Some Gravel											
478.0		19.0		6	SS			16		3.8	22.2	
477.0	Brown and Gray Residual CLAY with Trace Roots	20.0										
	End of Boring at 20 feet		20									

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

○ During Drilling Dry ft.
⚡ At Completion Dry ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling



BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT Spire Development, Inc.
PROJECT NAME Tanner's Creek Manor
PROJECT LOCATION Lawrenceburg, Indiana

BORING # B-06
ALT & WITZIG FILE # 25CN0405

DRILLING and SAMPLING INFORMATION

Date Started 12/5/25 Hammer Wt. 140 lbs.
Date Completed 12/5/25 Hammer Drop 30 in.
Boring Method HSA Spoon Sampler OD 2 in.
Driller STRATA Rig Type D-50 Track ATV

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % Dry Unit Weight (pcf)	Remarks
	SURFACE ELEVATION 523.0											
522.6	TOPSOIL (5-inches)	0.4		1	SS			6		2.8	28.5	
	Dark Brown CLAY with Trace Organics											
519.0		4.0		2	SS			10		2.8	19.9	
			5									
	Brown CLAY with Trace Sand and Gravel			3	SS			15		2.5	22.2	LL = 45% PL = 18% PI = 27%
514.5		8.5		4	SS			21		4.5	17.5	
513.0	Brown Silty Sandy CLAY with Gravel	10.0	10									
	End of Boring at 10 feet											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

○ During Drilling Dry ft.
▽ At Completion Dry ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling



BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT Spire Development, Inc.
PROJECT NAME Tanner's Creek Manor
PROJECT LOCATION Lawrenceburg, Indiana

BORING # B-07
ALT & WITZIG FILE # 25CN0405

DRILLING and SAMPLING INFORMATION

Date Started 12/5/25 Hammer Wt. 140 lbs.
Date Completed 12/5/25 Hammer Drop 30 in.
Boring Method HSA Spoon Sampler OD 2 in.
Driller STRATA Rig Type D-50 Track ATV

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-1sf Unconfined Compressive Strength	PP-1sf Pocket Penetrometer	Moisture Content % Dry Unit Weight (pcf)	Remarks
	SURFACE ELEVATION 522.0											
521.6	TOPSOIL (5-inches)	0.4										
520.5	Dark Brown CLAY	1.5		1	SS			10		2.5	26.8	
	Gray and Brown CLAY with Trace Gravel and Sand			2	SS			19		4.5	17.6	
			5									
515.0		7.0		3	SS			50/4		4.5	17.3	LL = 45% PL = 19% PI = 26%
514.7	Brown Silty Sandy CLAY with Some Gravel	7.3										
	(Auger Refusal @ 7.3-feet) End of Boring at 7.3 feet											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

○ During Drilling Dry ft.
⚡ At Completion Dry ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling



BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT Spire Development, Inc.
PROJECT NAME Tanner's Creek Manor
PROJECT LOCATION Lawrenceburg, Indiana

BORING # B-08
ALT & WITZIG FILE # 25CN0405

DRILLING and SAMPLING INFORMATION

Date Started 12/5/25 Hammer Wt. 140 lbs.
Date Completed 12/5/25 Hammer Drop 30 in.
Boring Method HSA Spoon Sampler OD 2 in.
Driller STRATA Rig Type D-50 Track ATV

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % Dry Unit Weight (pcf)	Remarks
	SURFACE ELEVATION 533.0											
532.6	TOPSOIL (5-inches)	0.4		1	SS			6		3.0	24.2	
	Dark Brown CLAY with Trace Organics											
529.5		3.5		2	SS			14		1.5	20.8	
			5									
	Brown CLAY with Gravel			3	SS			10		2.0	19.5	LL = 45% PL = 19% PI = 26%
524.0		9.0		4	SS			16		4.5	18.8	
523.0	Brown and Gray Residual CLAY	10.0										
	End of Boring at 10 feet		10									

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

○ During Drilling Dry ft.
⚡ At Completion Dry ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

- N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split-spoon.
- Qu: Unconfined compressive strength, TSF
- Qp: Penetrometer value, unconfined compressive strength, TSF
- Mc: Water content, %
- LL: Liquid limit, %
- PL: Plastic limit, %
- Dd: Natural dry density, PCF
- : Apparent groundwater level at time noted after completion

DRILLING AND SAMPLING SYMBOLS

- SS: Split-spoon - 1 3/8" I.D., 2" O.D., except where noted
- ST: Shelby tube - 3" O.D., except where noted
- AU: Auger sample
- DB: Diamond bit
- CB: Carbide bit
- WS: Washed sample

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

<u>TERM (NON-COHESIVE SOILS)</u>	<u>BLOWS PER FOOT</u>
Very loose	0 - 4
Loose	5 - 10
Firm	11 - 30
Dense	31 - 50
Very Dense	Over 50

<u>TERM (COHESIVE SOILS)</u>	<u>Qu (TSF)</u>
Very soft	0 - 0.25
Soft	0.25 - 0.50
Medium	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.(+)	Coarse Sand	5 mm-0.6 mm	Silt	0.075 mm - 0.005 mm
Cobbles	8 in. - 3 in.	Medium Sand	0.6mm-0.2 mm	Clay	0.005mm(-)
Gravel	3 in. - 5 mm	Fine Sand	0.2mm-0.075 mm		

SECTION 00 72 00

CONDITIONS OF THE CONTRACT

AIA DOCUMENT A 201 - GENERAL CONDITIONS OF THE CONTRACT

The AIA A201 General Conditions of the Contract for Construction are hereby made a part of the Specifications. Due to copyright laws copies of the document may not be reproduced. Copies are available from the Architect or any American Institute of Architect office.

END OF SECTION

SECTION 01 10 00

SUMMARY

1.01 EXTENT OF CONTRACT

- A. It is the intent of this Specification that the General Contractor provides a complete project to the Owner as shown on the drawings and specified hereinafter. This shall include hook-ups to utility service lines (sewer, water and electricity), grading, paving and planting.
- B. The General Contractor shall be responsible for the structural permit, fees, tap charges, use charges, utility company charges, etc. The Owner shall not pay any fees of any type and thus the General Contractor shall pay all fees of any type. The Plumber, HVAC and Electrical Subcontractors shall obtain their respective permits and include all respective fees and inspection fees in their scope of work.
- C. At the completion of the job the General Contractor shall be responsible for presenting a finished project, with all items and areas cleaned and in working order, ready for the Owner's occupancy and use. The General Contractor shall present all certificates of inspection and approvals from all governing agencies, product warranty information, certifications as required for certain installed items, e.g., "R" value of insulation) and occupancy permits to the Owner at the time of turnover.

1.02 PROPOSALS

- A. All proposals must be based on the drawings and on this Specification. If any material is unavailable at the time of bidding, the bid may be based on a satisfactory substitution provided that the substitution is listed with this bid along with an explanation as to why the materials specified were not available. Except for this listing the bid shall be considered as based entirely on the drawings and specifications.

1.03 SITE VISIT

- A. The General Contractor, all subcontractors and other bidders shall visit the site prior to submitting his bid so as to get a comprehensive knowledge of the conditions of same. Failure to do so will not relieve him of any responsibility for doing any work which such a visit and inspection might have made evident.

1.04 RIGHTS RESERVED

- A. The General Contractor reserves the right to accept or reject any proposal.

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

1.01 INSURANCE

- A. General Contractor shall maintain Workmen's Compensation Contractor's Liability, Contractor's and Owner's Contingent Liability, and Automobile Liability Insurance. He shall maintain such insurance as will protect him from claims under Workmen's Compensation Act and from claims and damages because of bodily injury, including death, and damage to property of others, and claims for damages arising out of the operation of motor vehicles, which may arise from and during operations under this Contract, whether such operations by himself or by any subcontractor or anyone directly or indirectly employed by either of them. The limits of such liability insurance shall not be less than \$500,000/\$1,000,000 Bodily Injury and \$500,000/\$500,000 Property Damage. The General Contractor shall also provide coverage for all materials, supplies, equipment and temporary structures of kinds incidental to construction of said buildings (when under the control and responsibility of the General Contractor). Once said materials have been installed in the building and paid for by the Owner, the insurance coverage becomes the responsibility of the Owner. The General Contractor shall also (when not otherwise insured) provide coverage for builders' machinery, tools and equipment belonging to others for which the insured is liable, all while forming a part of or contained in said building and for temporary structures or within 100 feet of when adjacent thereto on sidewalks or streets, at 100% of the insurable value thereof.

1.02 SHOP DRAWINGS

- A. Where noted in the various subsections of this Specification, each Subcontractor and material supplier shall provide complete shop drawings, samples of materials, finish and color selection charts and installation instructions to the General Contractor for his approval. All drawings shall be carefully checked by the General Contractor before forwarding them to the Architect. The approval of such drawings shall be general and in no way relieves the contractor of the responsibility for proper fitting and the construction of the work in strict accordance with the contract requirements. All drawings must be marked with the name of the project and submitted in a minimum of six (6) copies. The Architect will retain one (1) copy of drawings. Should more sets of approved drawings be needed, a sepia shall be submitted and additional copies made after approval. Drawings shall be submitted sufficiently in advance of work to allow checking and necessary correction without delaying progress of the job.
- B. Shop drawings that are related shall be submitted together so that all drawings may be checked and cross checked to avoid approval of one drawing which may conflict with the next submission.
- C. Where used in conjunction with the Architect's response to submittals, requests, applications, reports and claims by the Contractor, the term "approved" will be held to limitations of the Architect's responsibilities and duties as specified in the General and Supplementary Conditions. In no case will the Architect approval be interpreted as a release of the Contractor from responsibilities to fulfill requirements of contract documents or acceptance of the work, unless otherwise provided by requirements of the contract documents.

1.03 GUARANTEE

- A. This Specification requires that certain work be guaranteed and maintained in good condition for a specified time after its final acceptance and payment thereof, and bond which will be required in connection with the contract must also cover such guarantee. All workmanship not otherwise specified shall be guaranteed for a period of one (1) year from the completion of the Contract, any defects in same shall be corrected at no expense to the Owner. All equipment guarantees shall be retained and turned over to the Owner at the completion of the job.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

1.01 APPLICABLE CODES

- A. Throughout this Specification there is reference to materials and workmanship being in compliance with applicable codes. In this context, applicable codes is to mean: the State and City Building Codes, Life Safety Code, and any Local Building, Zoning and Fire Zone Standards. All codes shall be the current edition, including all amendments at the time the building permit is issued.
- B. Applicable codes shall also include all codes, standards, and testing agencies referenced in any of the codes listed above and thus made a part of those codes, i.e., NFPA Standards, ASTM, ASHRAE, and Underwriters Laboratories.

1.02 EXPLANATION

- A. This Specification is intended to supplement the Drawings and together the Drawings and Specifications form the Contract Documents. It will not be the province of the Specification to mention any portion of the construction which the Drawings are competent to explain, nor is it the province of the Drawings to show items of work which can adequately be explained in the Specifications. Such omission is not to relieve the Contractor from carrying out the portions indicated on the Drawings; and should items be required by the Specification which are not indicated on the Drawings or mentioned therein, but which are necessary to complete the entire work, they must be supplied and placed as directed by the Architect. Minor items of work not shown on the Drawings or listed in the Specifications that are required to complete the work shall be supplied as part of this Contract.
- B. The decision of the Architect as to the interpretation of the drawings and specifications shall be final. Details are supplementary and all required work shall be furnished whether repeated on details or not.

1.03 COORDINATION OF TRADES

- A. Sections of these Specifications set down guidelines as to the extent of work by subcontractors. These guidelines are set forth to aid in the bidding process and help with estimating trade payment breakdowns and monthly payment requests only.
- B. The General Contractor is responsible for the administration of all subcontractors and, therefore, is not obligated to the work descriptions listed herein. As previously mentioned, the General Contractor must provide a total and complete project and thus may divide the work between subtrades as he feels is most efficient and economical to provide a complete project.
- C. The Architect is not responsible for providing complete coverage of work between subtrades in the work descriptions of the sections of this Specification. Therefore, the Architect will not arbitrate or even discuss overlapping or voids that occur in scope of work between subtrades. The General Contractor alone shall handle this type of problem where there is a question as to which subtrade will take care of which items of work.
- D. The General Contractor shall coordinate all subtrades regardless of the specification headings and shall make all necessary provisions for accommodation of all equipment and

fittings into the building and patching after if necessary. These provisions do not however relieve the subcontractors from the responsibility of coordinating all work with the other subtrades.

1.04 GENERAL INSTALLATION

- A. The General Contractor and subcontractors are responsible for the installation of all items in the building in accordance with the Contract Documents.
- B. Pre-Installation and Coordination.
 - 1. Well in advance of each installation of work the associated subcontractors, General Contractor and Architect, if needed, shall review the space requirements, order of installation, coordination and interface of trades involved, general timetable and sequence. Where applicable the manufacturer's representative or manufacturer's specific instructions shall be consulted to insure that service access, ventilation, hook-ups, etc. are adhered to.
 - 2. **Any conflicts or problems shall be brought to the attention of the Architect** and specific remedies shall be provided that are acceptable to all parties before installation work proceeds. If installation work proceeds without a job site review, and problems are discovered that cause additional work by other trades that could have been avoided by such as an initial review, the corrective measures shall be at the expense of the subcontractor proceeding without first coordinating with others. Any corrective work required shall be performed by the trades responsible for the original installation or by the subcontractor negligent on coordination with the permission of the original installing subcontractor. Final warranties shall remain the responsibility of the original installing subcontractor.
- C. Job Site Inspection
 - 1. Each installer of each major unit of work shall inspect substrate to receive the work, and conditions under which the work will be performed, and report in writing to the Architect and the Contractor's representative unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to installer.
- D. Manufacturer's Instructions
 - 1. Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation to whatever extent these are more explicit or more stringent than applicable requirements indicated in contract documents.
- E. Inspect each item of materials or equipment immediately prior to installation, and reject damaged and defective items.
- F. Provide attachment and connection devices and methods for securing work properly as it is installed; true to line and level, and within recognized industry tolerances if not otherwise indicated. Allow for expansions and building movements. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual effect choices to the Architect for final decision.
- G. Recheck measurements and dimensions of work, as an integral step of starting each

installation.

- H. Install work during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion which will ensure best possible results for each unit of work, in coordination with entire work. Isolate each unit of work from incompatible work, as required to prevent deterioration.
- I. Coordinate enclosure (closing in) of work with required inspections and tests, so as to avoid necessity of uncovering work for that purpose.
- J. Mounting Heights
 - 1. Except as otherwise indicated, mount individual units of work at industry recognized standard mounting heights, for applications indicated. Prior to start of installation all mounting heights shall be reviewed with the Architect and Owner for approval.

1.05 CUTTING AND PATCHING

- A. Do not cut and patch structural work in a manner resulting in reduction of load carrying capacity or load/deflection ratio; submit proposed cutting and patching to Architect for approval before proceeding. Do not cut and patch operational elements and safety related components in a manner resulting in reduction of capacities to perform as intended or resulting in decreased operational life, increased maintenance or decreased safety. Do not cut and patch work which is exposed on exterior or exposed in occupied spaces of the building in a manner resulting in reduction of visual qualities or resulting in substantial evidence of cut and patch work, both as judged solely by the Architect. Remove and replace exposed work judged by the Architect to be cut and patched in a visually unsatisfactory manner.
- B. Materials
 - 1. Except as otherwise indicated or approved by the Architect provide materials for cutting and patching which will result in equal or better work than work being cut and patched in terms of performance characteristics and with original material where feasible and recognized that satisfactory results can be produced thereby.
- C. Temporary Support and Protection
 - 1. Provide adequate temporary support for work to be cut to prevent failure. Do not endanger other work. Provide adequate protection of other work during cutting and patching to prevent damage and provide protection of the work from adverse weather exposure.
- D. Cut work by methods least likely to damage work to be retained and work adjoining.
- E. Where physical cutting action is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through concrete work.
- F. Comply with the requirements of applicable sections of Division 2 where cutting and patching requires excavating and backfilling.
- G. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

- H. Where feasible inspect and test areas to demonstrate integrity of work.
- I. Restore exposed finishes of patched areas, and where necessary, extend finish restoration onto retained work adjoining, in a manner which will eliminate evidence of patching.
- J. Where patch occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coats.

1.06 TRIAL UNITS

- A. General Contractor shall arrange for each Subcontractor to totally complete one (1) unit of each type as soon as it can be practically accomplished for inspection by the Inspecting Architect. This shall be done to discover any problems of coordination between trades or any problems which could be resolved before they are repeated in succeeding units. In order not to delay the construction, the Architect will review the work in the trial unit after the completion of each of the following:
 - 1. Rough-in mechanical and electrical work.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES

1.01 MISCELLANEOUS ITEMS BY THE GENERAL CONTRACTOR

- A. The General Contractor shall provide ample sanitary temporary toilet accommodations for the use of all workmen. Prior to the completion of the contract, all connections and appliances therewith shall be removed and the area finished as required by the drawings and Division Two (2) of these Specifications.
- B. The General Contractor shall provide and maintain all necessary fences, security guards, lights, etc., for the protection of the public and workers. All work shall be in accordance with OSHA and local codes. Protect entries for employees and visitors as required.
- C. Installation of the temporary electric service shall be provided by the Electrical Contractor. The use charges for the electricity shall be by the General Contractor. Review scope of installation with the General Contractor.
- D. Before the building is closed in, miscellaneous heat shall be provided by the trade needing same. Once the building is closed in, the heat shall be by the General Contractor. Once units are turned over for occupancy the utility charges shall be by the Owner. The permanent heating system can be used only after drywall and prime painting are complete and units are broom cleaned. Filters shall be changed as needed during construction to insure proper operation. New filters shall be installed at time of turnover to Owner.
- E. Temporary water shall be supplied by the General Contractor and he shall make all arrangements for temporary tap and meter and pay all use charges.

END OF SECTION

SECTION 01 60 00

PROJECT REQUIREMENTS

1.01 PRODUCTS

- A. All products shall be exactly as shown in the manufacturer's catalogs at the time the specifications are written. Any changes made to products (i.e., washers, valves, mfg. outside USA, etc.) after that date shall be enumerated on the shop drawings. Changes in the product, even minor, may be cause for rejection by the Architect if he feels the changes lessen the quality or alter the performance.

1.02 SUBSTITUTIONS OR "APPROVED EQUALS"

- A. The drawings and specifications are based on what the Architect considers to be the best systems and materials available for this particular project. Many sections of the specifications list several manufacturers. This means that the Architect considers these manufacturers equal to the one specified. It does not mean the Architect considers all products by this manufacturer equal to the models specified. The contractor shall verify that the manufacturer makes an equal product and shall submit item for item substitutions by the equal manufacturer so that the Architect may verify and approve that the items are of equal quality to the ones specified. The drawings are based ONLY on the first manufacturer listed in each section.
- B. Should any contractor wish to bid a product listed as an equal in this Specification, he shall verify that the product will fit into the spaces shown and that the product does not require plan modifications. If modifications or extra work is required by other contractors due to this change, this contractor shall list all other trades affected and the extra costs incurred by these contractors as a result.
- C. Due to the fact that the Architect cannot know of all new products being introduced, and in the interest of an open Specification allowing for competitive bidding, some sections of this Specification indicates "or approved equal". This shall not mean that any company making similar products may be used. It shall mean that the Architect will consider only true "equal" products. During the bidding process the subcontractors may propose approved equals with their bids; however, the Architect will not review equals until the bidding process is completed. In the interest of time, the Architect will review only proposed substitutions from the General Contractor.
- D. Any subcontractor wishing to submit a voluntary alternate for any other manufacturer or product not listed as an "approved equal" shall provide a complete description to the General Contractor, who shall review the information, concur that the product is indeed an equal and forward the information to the Architect for approval. After the Architect gives his approval, he shall then submit the information to the Owner for his approval. If all parties concur that the product is an equal, the General Contractor shall submit a change order for said product.

END OF SECTION

SECTION 01 71 23

FIELD ENGINEERING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SUMMARY

- A. Provide all labor, materials, equipment, and services necessary for all site layout work.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Earth Work (Division 31)
- B. Layout of all curbs and concrete sidewalks (Division 32)

PART 2 & 3 PRODUCTS & EXECUTION

3.01 SITE LAYOUT

- A. All layout work shall be done by a competent Surveyor registered in the state of project location.
- B. Verify all boundaries and corner points of the property prior to any other layout work.
- C. Establish levels by referring to the permanent bench mark.
- D. Establish additional bench marks, as approved by the Architect to facilitate the work.
- E. Check all dimensions in the field.
- F. Stake out shall be completed in every respect to accurately establish the lines and grades for all earthwork and construction as shown on the drawings and herein specified. Without limiting the extent of work, some items are as follows:
 - 1. Rough stake streets, parking and building pads.
 - 2. Stake sanitary and storm sewers and furnish cut sheets.
 - 3. Stake water main, hydrants, meter and furnish cut sheets.
 - 4. Stake footers for excavation.
 - 5. Pin corners of footers for concrete block or slab on grade form work.
 - 6. Stake curbs and walks for installation of form work.
 - 7. Provide As-Built Survey for sanitary water and storm sewers (acceptable to

governing authority).

8. Provide As-Built Survey for buildings, parking and drives (acceptable to lender and Title Company).

3.01 CLEAN UP

- A. This Subcontractor shall keep the premises free of debris and unusable materials resulting from his work.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

1.01 RECORD DRAWINGS AND SPECIFICATIONS

- A. During the process of work it shall be the responsibility of each subcontractor to keep records of all changes in construction and to provide these changes to the General Contractor on a regular basis. (Marking up a set of prints at the completing of the job from memory is not acceptable.) The General Contractor shall obtain marked up changes from all subcontractors and shall ultimately be responsible for providing all changes to the Architect. The General Contractor shall transfer all changes to a clean set of contract prints and deliver to Architect.
- B. Mechanical and Electrical trades shall clearly mark the location of all access panels, shut-off valves, disconnects, electric panels, balancing valves, test locations, bleeder valves, junction boxes, etc. that will require access by building maintenance and repair personnel.
- C. Routing for underslab and underground utilities shall be shown (i.e., site electric wiring, water lines, sewer lines, including all clean out, etc.) for aiding in locating for possible repairs.
- D. One complete set of shop drawings shall be provided to the Owner at the completion of the job detailing all products and systems used in the building.

1.02 FINAL CLEANING

- A. Specific cleaning instructions are listed in various sections of the Specifications and general "broom clean" instruction for all trades are listed during the progress of work.
- B. At the completion of the job the entire project or each building as applicable shall be thoroughly cleaned before turn-over to the Owner. The cleaning may be performed by a separate subcontractor or by the various subcontractors performing work on the job at the discretion of the General Contractor. All subtrades shall verify the extent of cleaning required and shall include this work, if applicable, in the bid. Some items or work included, without limiting the generality of the work "extent" are as follows:
 - 1. Remove all labels, stickers, etc. from all items and clean all items to a dirt-free condition.
 - 2. Clean transparent materials, including mirrors and windows/door glass, to a polished condition, removing substances which are noticeable as vision obscuring materials. Replace broken glass and damaged transparent materials.
 - 3. Clean exposed exterior and interior hard surface finishes, to a dirt-free condition, free of dust, stains, films, and similar noticeable distracting substances. Except as otherwise indicated, avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.
 - 4. Wipe surfaces of mechanical and electrical equipment clean, including elevator equipment, if applicable, and similar equipment. Remove excess lubrication and other substances.

5. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
 6. Clean concrete floors in non-occupied spaces broom clean.
 7. Vacuum clean carpeted surfaces and similar soft surfaces.
 8. Clean plumbing fixtures to a sanitary condition, free of stains including those resulting from water exposure.
 9. Clean vinyl, ceramic and quarry tile floors of all marks. Wax tile surfaces as required by manufacturer.
 10. Clean food service equipment, if applicable, to a condition of sanitation ready and acceptable for intended food service use.
 11. Clean light fixtures and lamps so as to function with full efficiency.
 12. Clean project site (yard and grounds) including landscape development areas of litter and foreign substances. Sweep paved areas to a broom clean condition and hose, if needed. Remove stains, petrochemical spills and other foreign deposits. Rake grounds which are neither planted nor paved, to a smooth, even textured surfaces.
- C. It is the intent of this specification that the entire project (including site) will be left in a clean "new" condition for use by the Owner. All debris, including temporary signs, job trailer etc. shall be removed completely and all areas restored to a satisfactory condition in accordance with the Contract Documents.

1.03 SUBSTANTIAL COMPLETION

- A. At the completion of the work, or sections of the building, or site, the General Contractor shall begin final cleaning operations and shall initiate a thorough punch list inspection of all work for defects and faulty workmanship. Upon completion, the General Contractor shall notify all subtrades of corrective work required and shall supervise these corrections and reinspect as needed.
- B. Once the General Contractor is satisfied that all corrective work is completed, the Architect shall initiate a detailed and thorough inspection of the project or individual buildings, if project is being done in phases. At this time, the final cleaning needs to be substantially completed. If dirt and debris remains that hinders the Architect's ability to inspect thoroughly, the inspecting process shall be halted until the cleaning work is substantially completed. (It is not the intent of the Architect to require all areas to be "spotless" before inspecting, but carpeting, flooring, cabinets, etc. must be cleaned in order for the Architect to determine if stains, scratches, etc. are present in the finished products.) All deficiencies will be noted and a list forwarded to the General Contractor for corrective measures. If, during the inspection, the Architect finds substantial number of items in each unit (eight or ten items per unit) needing correction, the General Contractor will be asked to reinspect more thoroughly before the Architect continues his review.

- C. At the completion of all corrective work listed on the Architect's Punch List the General Contractor shall notify the Architect and a reinspection will be performed. This process shall continue until all items have been corrected. At this time the satisfactory area shall be locked to prevent re-entry of any subcontractors.
- D. Prior to final inspection all mechanical and electrical systems shall have been tested and approved by all governing authorities. Before final turn-over each subtrade, through the General Contractor, shall schedule a demonstration with the Architect and the Owner's representatives to explain the complete operation of each system and instruct the Owner's representatives in the use of each system. At the end of the demonstration the subcontractor shall turn over all warranty information, spare parts, maintenance and operating manuals, along with a list of equipment, by model numbers, and supplies so that the Owner may call for future parts and/pr repairs.

1.04 FINAL TURNOVER

- A. At the time of final turn over to the Owner the following items shall be completed:
 - 1. All inspections by the Architect and Owner shall be completed and all "punch out" items shall be corrected to the satisfaction of all parties involved.
 - 2. All system and equipment demonstrations to the Owner's representative shall be completed.
 - 3. All warranties, maintenance manuals, parts, list, equipment literature, etc. shall be turned over to the Owner.
 - 4. Provide certifications of final acceptance by all agencies having jurisdiction, (i.e., Building Department, Fire Marshall, etc.)
 - 5. Provide certifications and test data on all carpeting, wall covering, flooring, etc. to the Owner.
 - 6. Destroy any construction keying, remove all temporary locks and provide master keys and permanent keys to all locks. Keys shall be delivered in a key cabinet with all keys labeled by room.
 - 7. All final cleaning shall be completed with all debris, job trailer, etc. removed from the site and disturbed areas restored.
 - 8. Submit list of any incomplete items for escrow along with cost to be withheld and a schedule of completion for the outstanding work.

END OF SECTION

SECTION 03 31 00

CONCRETE

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary to complete all plain and reinforced concrete work as shown on the drawings and hereinafter specified.
- B. Some items of work included, without limiting the generality of the word "extent" are as follows:
 - 1. Provide laboratory design service, field work, and testing service as herein specified.
 - 2. Provide layout for foundations from corner posts provided by Surveyor.
 - 3. Provide excavation for grade beams, foundations, curbs, and walks.
 - 4. Provide and install reinforcing bars and vapor barrier in locations as shown on the drawings.
 - 5. Provide and install perimeter insulation under building slabs as shown on the drawings.
 - 6. Provide and install all anchor bolts as shown on drawings. Coordinate location with Carpenter.
 - 7. Coordinate termite protection of slab areas prior to pouring. In addition, coordinate termite protection of garage floors, patios and stoops. No concrete shall be poured without each area being treated for termite protection.

1.03 RELATED SECTIONS

- A. Site layout: by Surveyor
- B. Subgrade excavation for paving, curbs and sidewalks: 32 16 00
- C. Concrete for site lights is by the electrical contractor
- D. Concrete work related to masonry work, such as placing concrete and reinforcing in block or brick walls shall be performed by masonry contractor

1.04 COORDINATION WITH OTHER TRADES

- A. In particular this contractor shall coordinate the installation of dowels in footings and slabs to tie in with concrete block wall reinforcing.

- B. Unless other satisfactory agreement, acceptable to the Architect and General Contractor, is specifically entered into by the subcontractors concerned, all other items such as sleeves, piping, inserts, conduit, hangers, ties, etc., furnished in connection with the work of other trades or other subcontractors and required to be "poured in" shall be installed as a part of the work of other subcontractors concerned, with whom this subcontractor shall cooperate. This subcontractor shall notify all trades sufficiently in advance to allow for installation of all items prior to pouring concrete. Prior to pouring this subcontractor shall check to insure that all items installed by others are securely attached and braced to prevent being moved during the pour.

1.05 QUALITY ASSURANCE

- A. All concrete shall be ready mixed. Except as may be modified herein, concrete work including, but not limited to, materials, proportioning, mixing, placing, curing, form stripping, and testing shall conform to the requirements of (current edition):
1. ACI 301, "Specifications for Structural Concrete for Buildings", as modified and supplemented herein.
 2. ACI 318, "Building Code Requirements for Reinforced Concrete".
 3. ACI 347, "Recommended Practice for Concrete Formwork".
 4. Building Code and regulations of authorities having jurisdiction.
 5. Details of concrete reinforcement and accessories not covered herein shall be in accordance with ACI Manual SP-66.
- B. All footing trench excavating shall be inspected by the Building Inspector (as required by local jurisdiction) and the Soils Engineer prior to placement of concrete.

1.06 SUBMITTALS

- A. Submit for review, prior to delivery of concrete, copies of proposed design mixes, including proportions and water/cement ratio and test reports for mixes made within the last twelve (12) months.
- B. Submit manufacturer's product literature and test data for all proposed admixes, curing compounds, etc. being used on the project.

PART 2 PRODUCTS

2.01 GENERAL

- A. Concrete work shall conform to all requirements of ACI 301, "Specifications for Structural Concrete of Buildings", except as modified by the following supplemental requirements. The supplemental requirements are keyed to section numbers of ACI 301.
- 2.2 Admixtures required are indicated in the concrete mix proportions. The contractor shall receive written approval from the Architect/Engineer before using admixtures.
- 3.1.1 The contractor shall submit the design mixes and all supporting data for approval as soon as possible after the award of the contract.
- 3.2 Concrete for the different structural elements of the project shall have the following strengths:

<u>Mix Class</u>	<u>fc</u>
(G) interior slabs and all project concrete	3500

if not identified otherwise hereafter
(not exposed to weather)

- 3.7.1 Calcium chloride shall not be used without written permission from the Architect or Engineer.
- 4.1.3 (1) Earth cuts may be used as forms for footing vertical surfaces, if sides are sharp and true, not exposed in finished structure and not required to have surface treatment of any kind. Architect must give approval on all earth forms.
- 5.1.3 Visual method of identification in field of bar strengths shall be shown on shop drawings and be according to C.R.S.I. manual of standard practice.
- 5.1.4 When requested, furnish copies of certificates of mill tests, covering all bars, mesh and wire used, or copies of test reports made by an independent testing laboratory acceptable to the Architect, showing conformance of the materials with specification requirements.
- 5.2.1 All #2 and #3 bars shall be grade 40. All other reinforcement shall be grade 60.
- 7.1.1 Delivery tickets shall show the following:
1. Batch number.
 2. Mix by class and cement content with maximum size aggregate.
 3. Admixture.
 4. Air Content.
 5. Slump.
 6. Time of loading.
 7. If any water is added to the mix on the job, it must be approved by the Architect's representative and delivery ticket noted with the amount of water and signed by the representative of the Architect.
- 8.3.1 All concrete shall be discharged at the job within 1-1/2 hours after water has been added to the cement and aggregates, or cement batched with the aggregates, unless a longer time is specifically authorized by the Architect; during hot weather, and also under other conditions contributing to quick stiffening of concrete, or when the high early strength cement is being used, the Architect may require a reduction in this elapsed time.
- 11.5.1 Sawed control joints shall be sawed 1/8" wide and depth equal to 1/4 of the slab thickness unless otherwise approved. Terminate reinforcing at all control joints. A keyed construction joint may be located where a sawed joint is shown.
- 11.7 Provide the following floor or exterior slab finishes:
- Interior slabs: Troweled finish per 11.7.3.

- 11.9 All floor and exterior slabs shall have a class B tolerance.
- 12.2 When concrete above grade is placed in the open and the temperature exceeds 80 degrees F. the curing method for the first 24 hours shall be by methods as described in Section 12.2.1.1, 12.2.1.2, or 12.2.1.3.
- 12.2.1.7 To insure that the curing compound is applied at the approved rate, the quantity of material in the container used for application shall be noted and the correct square footage of concrete surface for that quantity shall be outlined before starting the application. Curing compound shall contain a minimum of 18% solid content of chlorinated rubber. Before using on concrete which receives additional finishes, obtain the approval of the subcontractor applying such finishes.
- 16.2.1 The services of sections 16.3, 16.4, and 16.5 shall be paid for by the contractor.
- 16.2.2 The necessary testing services of sections 16.3, 16.4, 16.5, 16.6, and 16.7 shall be performed by a testing agency acceptable to the Architect/Engineer at the contractor's expense.
- 16.3.4.4 Concrete strength tests will be required during the progress of the project as follows:
- a. Make strength tests on each pour of concrete. If more than one pour is made in one day from the same supplier only one test is required. Pours of less than one truckload need not be tested. Check slump prior to pouring. All incorrect slump concrete shall be rejected for use in the work.
 - b. The exact location of the concrete in the work represented by each set of cylinders must be recorded and shown on the test reports. Provide an insulated moist box for protection of the cylinders until shipped to the laboratory.
 - c. Mold three specimens from each sample in accordance with the method of making and curing concrete compression and flexure specimens in the field (ASTM C51). Test one specimen at seven (7) days and test two specimens at twenty-eight (28) days in accordance with ASTM C39.
- B. Vapor barrier: Provide 6 mil Visqueen vapor barrier under all interior slab on grade.
- C. Perimeter Insulation: Material shall be Styrofoam S.B. as manufactured by Dow Chemical Company, Dyfoam by W. R. Grace Company, or approved equal. (R=5.0/inch). Thickness and size as shown on drawings. (Min R=10)
- D. Anchor bolts shall be sizes as shown on the drawings.
- E. Expansion joint material shall be non-extruding and resilient filler, conforming to ASTM Specification D1751. Filler may be composed of either cellular fibers or granulated cork with asphalt binder. Acceptable fillers: "Elastite" by Philip Carey Company; "Flexcell" by Celotex Corporation; "Corkfill" or "Fiber Joint" by W. R. Meadows. (1) Temporary Wood Fillers: Straight, sound strips in lengths to permit jointing where shown only. To be of

width and depth indicated, and tapered slightly from face to back. Coat with paraffin or equivalent, to seal against moisture and promote ready removal with forms. Must produce true, straight, joint edges.

2.02 UNDERSLAB GRANULAR FILL

- A. Granular fill under concrete slabs as shown on drawings.
- B. Granular fill shall consist of gravel or crushed gravel with not more than 10% fines (passing #299 sieve) and no stones larger than 1".
- C. All underslab trades shall be finished and have work inspected and approved before granular fill work is started. Granular fill shall be laid and raked level just before concrete work is to start.
- D. Contractor may at his option submit for approval by the Architect other material for underslabs granular fill. If required, this contractor shall submit samples to a recognized Soils Engineer for testing and further approval.

PART 3 EXECUTION

3.01 GENERAL

- A. All concrete work shall be installed in accordance with ACI-301, applicable codes listed previously, all state and local codes, and in a general good workmanship manner.

3.02 HOT WEATHER PROTECTION

- A. Hot weather concreting shall conform to ACI 305R (current edition), ACI "Recommended Practice for Hot Weather Concreting" and these Specifications.
- B. Hot weather concreting:
 - 1. In extremely hot weather, and with use of relatively hot materials, the temperature of concrete may be excessive. In no case will the use of concrete having a temperature in excess of 90 degrees F. be permitted. Cooling of water and/or aggregates will be required if concrete temperatures rise above this limit.
 - 2. Sprinkle forms, reinforcing steel and subgrade with cool water just before concrete is placed.
 - 3. Avoid prolonged mixing. Transport and place as quickly as practicable.
 - 4. Begin curing immediately after finishing using a method suitable for weather conditions and type of work. Continuous moist curing is required when air temperature at site is above 80 degrees F.

3.03 COLD WEATHER PROTECTION

- A. Winter concreting shall conform to ACI 306R (current edition), ACI "Recommended Practice for Cold Weather Concreting" and these Specifications.
- B. Protection: Unless adequate protection is provided and/or approval is obtained, concrete shall not be placed during rain, sleet, or snow.

- C. Concrete shall not be placed in forms or on grade which has been frozen unless all ground, forms, and reinforcing have been covered and heated for 24 hours prior to placing of concrete.
- D. To maintain the temperature of the concrete above the minimum placing temperature required the admixed temperature shall be not less than 55 degrees F. when the mean temperature falls below 40 degrees F.
- E. If water or aggregate has been heated, the water shall be combined with the aggregate in the mixer before cement is added. Cement shall not be added to mixtures of water and aggregate when the temperature of the mixture is greater than 100 degrees F.

3.04 EXCAVATION

- A. The concrete contractor shall excavate for all foundations. Excavation shall be from finished subgrade to depths as shown on the drawings.
- B. Earth forms can be used for grade beams and footing. If earth forms are to be used, the excavation must be done with much more caution and precision. If the soil gets saturated after excavation, the wet, soft soil must be removed before concrete is placed.

3.05 FORM WORK

- A. Construct forms to permit easy removal without damage to concrete and to withstand all vertical and lateral loads of fresh concrete, external and internal vibration, wind loads and other vertical and lateral loads that might be applied until such loads can be supported by the concrete structure.
- B. Form the sides of footings and grade beams with wood or metal forms only where soil conditions do not permit the use of earth forms.
- C. Construct forms for slots, penetrations, and other openings in concrete. Set sleeves for passage of mechanical and electrical forms for completeness, size and location.
- D. Conform to line, level, grade, shape, size, and position shown and shore or truss forms adequately to produce concrete which is true to dimensions and elevations shown on drawings within allowable tolerances listed in ACI 301, Table 4.3.1.
- E. Clean the forms so that they are free of paper, sawdust, dirt and debris when concrete is placed.
- F. Provide sufficient forms so that work can be carried out without delay of project. Maintain forms so as to eliminate formation of joints in concrete due to shrinkage of lumber.

3.06 REINFORCING STEEL

- A. Set chairs and accessories to secure reinforcing adequately. Support reinforcement for concrete to be placed on the ground with stands or concrete blocks. Supports shall be adequate to prevent displacement of reinforcing during pouring operations. All installation work shall be in accordance with CRSI publications for "Placing of Reinforcing Bars", current edition.
- B. Space, support, hold and fasten reinforcement and dowels with required and approved

ties, clips, and accessories to prevent displacement beyond permitted tolerances before and during placing of concrete. Check reinforcement as placed just before and during casting of concrete. Immediately correct displacement and provide additional supports to prevent recurrence.

- C. Tie the bars and bar supports together with 16 gauge wire. Set wire ties so that ends are directed into the concrete, not toward exposed concrete surfaces.
- D. Protect reinforcement by thickness of concrete shown in details on drawings. Place reinforcing bars to comply with details on drawings and with ACI-318, Chapter 7.
- E. Where typical splices are acceptable, provide standard reinforcement splices by lapping the ends, placing bars in contact and tightly wire tying. Lap the corners and approved splices in typical continuous reinforcing a minimum of 43 bar diameters.
- F. Install wire mesh in any areas shown on drawings.

3.07 PLACING CONCRETE

- A. Before placing concrete, remove all debris, water, etc. from the reinforcement and areas to be occupied by concrete.
- B. Obtain approval for subgrade bearing, reinforcement placement and all sleeves, box outs, anchors, etc. to be "poured in". Box out for electrical, TV and telephone, gas in the footer to allow for pipe or conduit to be held tight to slab face. See SU-1, mechanical/electrical drawings.
- C. Any areas where inadequate bearing is found shall be further excavated until satisfactory subgrade is established. The Soils Engineer shall be consulted for specific procedures in this case, as to whether compacted fill, gravel, lean concrete, or regular concrete shall be used.
- D. Placing
 - 1. Follow recommended procedures of ACI-304 for placing concrete.
 - 2. Handle concrete rapidly from mixer to forms, and deposit as nearly as possible in its final position to avoid segregation.
 - 3. Do not deposit concrete that has partially hardened or been contaminated by foreign material. Do not use retempered concrete.
 - 4. Place concrete upon clean, well thawed, damp surfaces, free from water, and never upon soft mud or dry porous earth.
 - 5. Use of chutes shall be subject to approval.
 - 6. Place concrete in horizontal layers, and stamp and spade well.
 - 7. Place concrete at such a rate that surfaces of concrete which have not reached joint level will not have received initial set before additional concrete is place thereon.
 - 8. Do not drop concrete over a distance of five feet (5') in height without use of tremie.

9. Care shall be taken to finish the floors level at all toilet and bathtub locations. Review locations based on plumbing rough-in.

3.08 CURING

- A. Protect freshly deposited concrete from premature drying and excessively hot or cold temperatures and maintain with minimal moisture loss at a relatively constant temperature for the period of time necessary for hydration of cement and proper hardening of concrete.
- B. Keep forms wet in hot weather during the curing period. If forms are removed during the final curing period, complete the curing by keeping concrete surfaces wet.
- C. At end of final curing period remove curing materials and sweep or clean.
- D. Prevent rapid drying at end of the curing period.
- E. Keep curing methods and procedures for exposed concrete walls consistent throughout the work to ensure a reasonable color match.

3.9 INSTALLING PERIMETER INSULATION

- A. Vertical installation: Install perimeter insulation vertically and continuously under interior concrete floor slabs on grade against the inside face of exterior perimeter foundation walls where the finish of interior floor is at the same foundation walls. Use 24" minimum width.
 1. Lay against wall and backfill with fill that has been well tamped and drained. Compact fill as required.
 2. Set neatly, level, and with tightly butted joints. Fit neatly around pilasters, pipes, and other building conditions.

3.10 PROTECTION

- A. During construction operations use temporary planks or plywood on slabs at points of heavy traffic where completed surfaces are to remain permanently exposed.
- B. Protect concrete surfaces to remain permanently exposed from the placing of other concrete, mortar and cleaning of floor slabs and other construction, from spillage or careless application of wall board, compounds, cementitious and bituminous materials, and from scarring, rusting or damage by construction operations. Use nonstaining paper and plywood or other method suitable for the hazards.
- C. Provide concrete needed for installation of mechanical and electrical equipment where not otherwise specifically shown or specified.

3.11 FLOOR DRAINS

- A. The plumber has been instructed to set all floor drains below the level of the slabs. This contractor shall slope the slabs down to meet the drain height. The floors shall slope evenly and gradually to the drains to insure that the floor areas will in fact drain to the floor drains.

3.12 ANCHOR BOLTS

- A. Install anchor bolts embedded in concrete as shown. Bolts shall be at 4'-0" o.c. maximum. Provide within 1'-0" of all doorways and all corners. Each wall plate shall have a minimum of two (2) bolts.

3.13 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property and leave all floor broom clean in areas affected by his work.

END OF SECTION

SECTION 03 34 00

LIGHTWEIGHT CONCRETE FLOOR FILL

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for all lightweight concrete flooring work as shown on drawings and/or specified hereinafter.

1.03 RELATED SECTIONS

- A. Cast-in-Place Concrete: Section 03 31 00
- B. Drywall: Section 09 21 00

1.04 COORDINATION WITH OTHER TRADES

- A. Concrete fill work shall be performed after drywall work is completed unless an alternate arrangement is worked out which is acceptable to the Architect, General Contractor, and Owner. This subcontractor shall inspect the area to receive fill and report any deficiencies or incomplete items of work by other trades to the General Contractor for correction by those trades before concrete fill work proceeds. Verify that subfloor is properly nailed and free of delaminations.
- B. Coordinate installation around toilets and bathtubs with the plumber. All floor openings must be sealed off or blocked around to prevent concrete from flowing into floor system below.

1.05 SUBMITTALS

- A. Submit manufacturer's literature showing sound rating and fire rating tests for floor system shown on drawings along with installation instructions for review and approval.

1.06 GENERAL

- A. Installation shall be by use of approved mixing and pumping equipment. All materials included herein shall be approved by the Gyp-Crete Corporation.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Floor fill shall be Gypcrete 2000. All materials shall be as manufactured by Maxxon Corporation.
- B. Materials shall be as follows:

LIGHTWEIGHT CONCRETE FLOOR FILL
03 34 00-1

1. Gypsum Cement: Gyp-Crete Underlayment Compound
 2. Subfloor Sealer: Maxxon Floor Primer and Sealer or another approved sealer.
 3. Sand: 1/16" or less washed mason sand, mortar sand or plaster sand.
 4. Water: Potable, free from impurities that affect the setting of gypsum.
- C. Mixing proportion and methods shall be in strict accordance with product manufacturer recommendations.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Condition of surface shall be structurally sound, broom clean, and free of mud, oil, grease or other contaminants. This subcontractor shall inspect areas to receive fill and report any areas of concern to the General Contractor for corrective measures by the subtrade prior to starting fill work.
- B. Sealing: Spray one coat of Maxxon primer and sealer or other approved sealer with a concrete or garden sprayer over entire subfloor surface using one gallon per 400 square feet.
- C. To minimize damage to installed underlayment and to complete fire and sound seals, pouring should be scheduled after installation of drywall.
- D. Install Gyp-Crete at 3/4" minimum thickness over wood frame, spreading and screeding to a smooth surface. Place as continuously as possible until installation is complete so that no Gyp-Crete slurry is placed against Gyp-Crete that has obtained its initial set. Finished surface shall be suitably smooth (free of pits, waves, etc.) for finish floor materials (sheet vinyl and carpet). Any areas not acceptable shall be corrected by this contractor.

3.02 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property, and leave all floors broom clean in areas affected by his work.

END OF SECTION

SECTION 04 22 00

CONCRETE BLOCK

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for all concrete block as shown on the drawings or specified hereinafter.
- B. Some items of work are as follows:
 - 1. Provide miscellaneous steel lintels.
 - 2. Provide and install all ties, flashing, etc. as shown on drawings and specified hereinafter.

1.03 QUALITY ASSURANCE

- A. Masonry materials and installation shall conform to the OBC, and where applicable, to requirements of the American Insurance Association.
- B. Except as otherwise specified masonry materials and installation also shall conform to the following standards:
 - 1. Concrete masonry units: National Concrete Masonry Association.
- C. Obtain masonry units of each type from a single manufacturer and use the same manufacturer's product throughout project.
- D. Mortar ingredients of cement and lime for any specific use shall be of one brand from one manufacturer. Mortar shall be cement-lime, job mixed by proportion in accordance with "Standard Specifications for Portland Cement-Lime Mortar for Brick Masonry" Technical Note 8A, BIA designation M1-72, as published by the Brick Institute of America. Mortar materials and proportions approved on the basis of the laboratory's test reports specified hereinafter shall be used for the permanent work without substitution or change throughout the entire project.

1.04 CUTTING AND PATCHING

- A. Cutting and patching of completed masonry, when required due to omission or error on the part of this contractor, shall be done by him at his expense. Such cutting and patching, when required due to omission or error on the part of another contractor, shall also be done by this contractor but at the expense of the contractor in error.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. All materials delivered to the job shall be stacked in a dry place off the ground on a prepared plank platform and in a manner to promote circulation of air through and around the materials. Method of stacking shall be approved by the Architect. The stacked materials shall be protected by tarpaulins or plastic, weighted or tied to resist wind damage.

1.06 JOB CONDITIONS

- A. Prior to commencing masonry installation, carefully inspect the installed work of other trades and verify that all such work is complete to the extent that masonry work may commence.
- B. In the event that a discrepancy of incompleteness in the work of other trades becomes apparent, the General Contractor shall be notified. Do not proceed or continue masonry work until such discrepancies have been fully resolved and corrected.
- C. Consult other trades and make provisions that shall permit the installation of their work in a manner to avoid cutting and patching. Build in work specified under other sections, as necessary, and as the work progresses. All exposed edges shall be saw cut, neat and square.
- D. Protection during erection:
 - 1. Members of block in locations where they may be exposed to high winds during erection shall be adequately braced either until provision is made for the prompt installation of permanent support at the floor or roof level immediately above the story under construction or until such time as the masonry has attained sufficient strength to resist such forces.
- E. Protection from weather:
 - 1. Moisture from the weather must be kept out of all masonry during construction.
 - 2. The exposed top of all masonry work exposed to the elements shall be protected at all times when masons are not on the job. Immediate protection shall be provided in the event of rain or other inclement weather. Protection shall be by means of tarpaulins, waterproof non-staining paper, boards or other materials acceptable to the Architect so installed and weighted as to insure a tight cover that will not blow off in the event of high winds.
- F. Freezing weather:
 - 1. Remove ice or snow formed on the masonry bed by carefully applying heat until top surface of bed is dry to the touch. The use of salt or chemical deicers is prohibited. Remove all masonry that is frozen or damaged.
 - 2. Masonry units with suction in excess of 25 grams per 30 square inches shall be sprinkled with heated water just prior to laying. Water temperature shall be above 70 degrees F. when masonry units are above 32 degrees F. and 120 degrees F. when units are below 32 degrees F.

3. Protect masonry units, mortar, and grout for a period of 48 hours after placement.
 4. Construction requirements while masonry work is in progress:
 - a. When air temperature is 40 degrees F. to 25 degrees F. heat sand and/or mixing water to a minimum of 70 degrees F. and a maximum of 160 degrees F.
 - b. When air temperature is 25 degrees F. to 20 degrees F. heat sand and mixing water to a minimum of 70 degrees F. and a maximum of 160 degrees F. Use salamanders or other approved heat source on both sides of walls under construction. Use windbreaks when wind is in excess of 15 miles per hour.
 - c. When air temperature is 20 degrees F. and below, and only with Architect's concurrence, heat sand and mixing water to a minimum of 70 degrees F. and a maximum of 160 degrees F. Provide enclosures and auxiliary heat to maintain air temperature above 50 degrees F. Temperatures of masonry units when laid shall not be less than 40 degrees F.
 5. Construction requirements for completed masonry or masonry not being worked on:
 - a. When mean daily air temperature is 40 degrees F. to 32 degrees F. protect masonry from rain or snow for a period of 48 hours.
 - b. When mean daily air temperature is 32 degrees F. to 20 degrees F. protect and completely cover masonry with insulating blankets for a period of 48 hours.
 - c. When mean daily temperature is 20 degrees F. and below, maintain masonry temperature above 32 degrees F. by enclosures and supplementary heat, by electric heating blankets, infrared heat lamps or other approved methods.
 6. In general, recommendations established by the "Brick Institute of America" Technical Notes No. 1, 1A, 1B, and 1C and Technical Bulletin No. 16 established by the "National Concrete Masonry Association" shall be followed.
- G. Hot weather protection:
1. Protect masonry during construction from direct exposure of wind and sun when erected in an ambient air temperature of 95 degrees F. in the shade with relative humidity less than 50%.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete block:

1. In general, all concrete block shall be hollow blocks conforming to the requirements of ASTM Specification C90, Grade N, 1000 psi minimum compressive strength in thicknesses as indicated on the drawings.
 - a. Furnish half block, lintel block, solid end block, and any other special block noted on drawings or required to meet conditions.

2. Solid concrete block, where required, shall conform to ASTM C145, Grade N,1800 psi minimum compressive strength.
3. Block for all above and below grade work shall be made from:
 - a. Cement – ASTM C150.
 - b. Lime – ASTM C207, Type S.
 - c. Pozzolans – ASTM C618.
 - d. Aggregates – Normal weight per ASTM D33 in light weight per ASTM C331.
4. Block shall be cured a minimum of fourteen (14) days at atmospheric pressure by high pressure steam or equivalent method approved by the Architect. All block exposed to view in finished locations shall be uniform face texture.
5. Only block which has been properly cured to specified moisture content (40% of maximum absorption) shall be delivered to the job. Questionable block will be tested and shipment will be rejected if the average moisture content of five (5) standard units, selected from shipment at random by Architect's representative, is found to exceed specifications limits.
6. Block of moisture content exceeding specification requirements shall not be built into the work. The Architect may at any time require a re-check on moisture content, and block containing excess moisture shall be dried down to the acceptable maximum, either by further air drying or the use of heat, before being used. No extension of time for completion will be allowed due to delay caused by failure of the contractor to maintain stored block at the acceptable moisture content.

B. Metal Ties and Anchors:

1. Ties and anchors shall conform to the following applicable standards.
 - a. Standard specifications for cold drawn steel wire for concrete reinforcement, ASTM A82.
 - b. Standard specifications for welded steel wire fabric for concrete reinforcement, ASTM A185. Ties shall be corrosion resistant metal or coated with a corrosion resistant metal such as copper, zinc or other metal having equivalent or better corrosion resistant qualities.
2. For tying face brick to block back-up, use either plain (no drip loop) 6" Z-type wall ties, 7/8" x 7", 18 gauge corrugated or 3/16" dia. x 7" plain Z-bar, "Eraydo Zinc" ties both made by Hohmann and Barnard, New York NY; or 1/8" dia x 7" serpentine stem, loop both ends hard copper wire ties, as approved by the Architect; spacing 16" horizontal and 16" vertical. Where shown on plans the block and brick wall will be tied with horizontal reinforcements.

C. Horizontal Wall Reinforcement:

1. Masonry wall reinforcement shall be Dur-OL-Wall Truss design "Lox-All" or approved equal truss design and shall have materials approval by Building Officials Conference of America, Inc. (BOCA) building code organization. Reinforcing shall be manufactured from cold drawn steel wire conforming to ASTM A82, and shall consist of two deformed longitudinal side rods welded at 16" intervals to a continuous diagonal cross rod forming a truss design. Out to out spacing of side rods shall be approximately 2" less than the nominal thickness of the wall or wythe. Cross rods shall not be less than #9 gauge. Side rods shall be #9 where indicated on drawings they shall be 3/16". Prefabricated sections shall be furnished where shown on structural drawings and prefabricated or job fabricated corner and tee sections shall be used to form continuous reinforcement around corners, and for anchoring abutting walls and partitions. Materials in corner and tee section shall correspond to type and design of reinforcement used.

D. Mason Flashing and Felt:

1. Mason's flashing shall be minimum 20 mil heavy plastic sheeting type. Plastic sheeting shall be "Nervastral Seal Pruf", type "H-D", as manufactured by Rubber and Plastic Compound Company, Inc., New York NY; Phoenix Plastic Seal; Wasco's "Wasco Seal", or approved equal.
2. Felt paper to be installed over all OSB wall sheathing shall be 15 lb. asphalt impregnated roofing felt installed with galvanized roofing nails.

E. Mortar Materials:

1. Mortar for all concrete block work above grade shall be spec mix type "N" mortar, ASTM C-91, 750 psi, or approved equal. Color shall be natural.
2. Mortar for all concrete block work below grade shall be type "M" mortar, ASTM C-91, or approved equal.
3. Water used shall be drinkable.
4. Sand used shall meet the requirements of ASTM C-144, Aggregate for Masonry Mortar, except that not more than 10% of materials shall pass a No. 100 sieve. Sand shall be measured damp and loose throughout all batches.
5. All mortar mixes shall be in accordance with ASTM C270. Mortar for Unit Masonry, type "N" mortar.

2.02 PREPARATION OF MATERIALS

- A. All mortar shall be machine mixed in a batch mixer. Care shall be taken in adding final water to the mix, to avoid over wetting. Mixing shall continue for not less than five (5) minutes after all materials are in the mixer. Mixer shall be completely empty and cleaned before it is recharged.

- B. Mortar on the boards shall be kept well tempered with water so long as its cementing materials have not started to set, so that it will be soft and workable when placed in the wall. Mortar shall not be retempered in the mortar box or mixer at any time, and retempering of mortar on the board shall be avoided if "initial set" of cementing material has been reached or mortar has stiffened greatly. All mortar shall be used within two (2) hours.
- C. No antifreeze additive, either liquid or powder, shall be incorporated in the mix to lower the freezing point of the mortar.

PART 3 EXECUTION

3.01 CONSTRUCTION AND WORKMANSHIP

- A. Concrete block:
 - 1. All walls and partitions shall be built true to dimensions, plumb and square. All work shall be laid in line, in level courses and plumb bond; double lines shall be used for all multiple-tier work, with each tier kept plumb.
 - 2. All required cutting of masonry units that will be exposed to view shall be done with equipment which will produce true edges, free of chipping.
 - 3. A full bed of mortar shall be laid on both face shells of hollow block work and enough head joint mortar shall be placed on vertical edges of block so that it oozes out on both sides when block is set.
 - 4. Joints in block work and all other masonry joints shall be firmly and neatly tooled when mortar is thumb print hard. Cut all joints off flush as work progresses and brush off surplus mortar; this applies to all masonry, exposed and not exposed, including pipe spaces.
 - 5. Trash dumpster walls shall be a wythe of brick and a wythe of block with the space between grouted solid with no voids.
- B. Anchoring:
 - 1. Anchor masonry to other construction when terminating against other construction or applied as a veneer.

3.02 CLEANING AND POINTING

- A. All surplus mortar, splatter, drippings, etc. shall be removed from all masonry, exterior and interior, as the work progresses.
- B. Clean and point at end of each working day, all concrete block work that is to be exposed. (Nail holes must be filled.)
- C. Finally, at the completion of the work, clean all concrete block in its entirety with non-acid cleaner and fiber brushes as needed.

- D. Clean out all defective mortar joints, fill solidly with mortar, and tool to match adjacent work.
- E. No cleaning acids shall be used on any type of masonry except by special permission of the Architect.

3.03 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor.

END OF SECTION

SECTION 04 70 10

APPLIED STONE VENEER

PART 1 GENERAL

1.01 General Requirements

- A. Reference is made to the Instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. Provide and install stone veneer with all accessories as shown on drawings and specified hereinafter.

1.03 REFERENCES

- A. ASTM International (ASTM):
 - 1. 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.
 - 2. ASTM C 1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - 3. ASTM C 1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: For each type of product indicated. Include manufacturer's written installation instructions.
- C. Shop Drawings: Show locations and installation of control and expansion joints elevations, sections, details of components, and attachments to other work.
- D. Certificates: Provide manufacturer's "certified applicator" certificate.

1.05 QUALITY ASSURANCE

- A. Certified Applicator: Applicators shall be trained and certified by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. The drawings are based on products by Environmental Stoneworks, Hinckley, Ohio 44233
- B. Acceptable Manufacturer: Dutch Quality Stone, which is located at: 18012 Dover Road, Eaton, Ohio 44659; Tel 330-359-7866; Email: info@dutchqualitystone.com; Web: www.dutchqualitystone.com

- C. Acceptable Manufacturer: Cultured Stone by Boral: 250 Industrial De. Franklin, Ohio 45005, Tel: 937-746-7139, Fax: 937-746-7167, Email: Troy.Vaughn@boral.com, Web: www.boral-buildingproducts.com
- D. Acceptable Manufacturer: PROCAL Stone Design, which is located at: 4253 Kellway Circle, Addison, TX 75001, Tel: 972-733-1314; Email: admin@procalstone.com, Web: www.procalstone.com

2.02 STONE MATERIALS AND ACCESSORIES

- A. Bonding Mortar: Thin-set bonding mortar by Versabond or equal.
- B. Limestone Veneer: To be determined
- C. Colorant: Mineral oxide composition, of colors necessary to create desired effect. Colorant may be batched into mix to create an overall change in veneer and/or spray applied in field to face of stone for variegated effect.

2.03 METAL LATH

- A. Expanded-Metal Lath: Comply with ASTM C 847 for material, type, configuration, and other characteristics indicated below.
 - 1. Material: Fabricate expanded-metal lath from structural-quality, zinc-coated (galvanized) steel sheet complying with ASTM A 653, G60 (ASTM A653M, Z180) minimum coating designation, unless otherwise indicated.
 - 2. Diamond-Mesh Lath: Self-furring, with integrally applied felt paper backing. Weight 2.5 lb/sq. yd. (1.4 kg/sq. m).
 - 3. Acceptable Manufacturers: Alabama Metal Industries Corp., CEMCO, Clark Western Building Systems, Marino-Ware.** NOTE TO SPECIFIER
** Metal accessories are recommended to terminate the system and control cracking, but not required except over full building expansion joints. Delete if not required.

2.04 ACCESSORIES

- A. General: Comply with material provisions of ASTM C 1063 and the requirements indicated below; coordinate depth of accessories with thicknesses and number of coats required.
 - 1. Galvanized Steel Components: Fabricated from zinc-coated (galvanized) steel sheet complying with ASTM A 653, G40 (ASTM A 653M, Z90) minimum coating designation.
 - 2. Acceptable Manufacturers: Alabama Metal Industries Corp., CEMCO, Fry Reglet Corp., Gordon Inc., Metalex (Keene Products).
- B. Metal Corner Reinforcement: Expanded, large-mesh, diamond-metal lath fabricated from zinc-alloy or welded-wire mesh fabricated from 0.0475 inch (1.2mm) diameter, zinc-coated (galvanized) wire and specially formed to reinforce external corners of work on exterior exposures while allowing full encasement by limestone application.
- C. Casing Beads: Square-edged style, with expanded flanges of zinc alloy, minimum 0.0207 inch (0.53 mm) thick.
- D. One-Piece Expansion Joints: Fabricated from zinc-coated (galvanized) steel; folded

pair of unperforated screeds in M-shaped configuration; with expanded flanges.

- E. Foundation Sill (Weep) Screed: Standard profile designed for use at sill plate line to form stop and prevent limestone from contacting damp earth.
 - 1. Basis of Design Product: SWS Superior Weep Screed (#7 sill screed) as manufactured by Superior Metal Trim.
- F. Lath Attachment Devices: Material and type required by ASTM C 1063 for installations indicated.
- G. Fiberglass mesh: Spider lath.

2.05 MISCELLANEOUS MATERIALS

- A. Water for Mixing and Finishing Limestone: Potable.
- B. Steel Drill Screws: For metal-to-metal fastening, ASTM C 1002 or ASTM C 954, as required by thickness of metal being fastened; with pan head that is suitable for application; in lengths required to achieve penetration through joined materials of no fewer than three exposed threads.
- C. Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C 1063.

2.06 MIXES AND COMPOSITIONS

- A. Thoroughly mix 1.5 gallons (6.0 L) of water for every bag of limestone veneer in mechanical mixer of sufficient capacity and power to properly blend materials.
- B. Color, Texture, Coursing of Finished Limestone Veneer: As selected by Architect from manufacturer's full range of colors and textures.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas and substrates, with applicator present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Verify that secondary moisture barrier is complete and has been inspected by authorities having jurisdiction.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by limestone veneer application.
- B. Properly prepare solid substrates for application of limestone veneer which must directly bond to the substrate. Remove contaminates, including curing compounds and bond breakers by necessary means to leave substrate sufficiently absorptive for an adhered hydraulically applied limestone veneer system.

3.03 INSTALLATION OF LATH

- A. Expanded-Metal Lath: Install according to ASTM C 1063.
- B. Install supplementary framing, blocking, and bracing at terminations in work and for support of fixtures, equipment services, and similar work to comply with details indicated or, if not otherwise indicated, to comply with applicable written instructions of lath and furring manufacturer.
- C. View architects detail for installation over rigid insulation on concrete.
- D. Install metal lath in accordance with manufacturer's recommendations.

3.04 INSTALLATION OF ACCESSORIES

- A. General: Install according to ASTM C 1063 and at locations indicated on Drawings.
- B. Miter or cope accessories at corners; install with tight joints and in alignment. Attach accessories securely to bases to hold accessories in place and in alignment during limestone installation. Install accessories of type indicated at following locations:
 - 1. External Corners: Install corner reinforcement at external corners.
 - 2. Terminations: Install casing beads, unless otherwise indicated.
- C. Weather Barrier [ASTM D 226, Type 1, Non-perforated asphalt-saturated felt paper] [UBC Standard 14-1, kraft water proof building paper] or [UBC Standards No 14-1, kraft waterproof building paper] or [ICC AC-38, synthetic house wrap]

3.05 STONE VENEER APPLICATION

- A. Apply materials, composition, and mixes to comply with manufacturer's recommendations.
- B. Do not use materials that are frozen, caked, lumpy, dirty, or contaminated by foreign materials.
- C. Do not use excessive water in mixing and applying limestone materials.
- D. Hydraulically apply limestone veneer with equipment of sufficient capacity to apply material at not less than 140 psi pressure at nozzle.
- E. Apply limestone veneer to a nominal thickness of 1 inch (25 mm), and not less than 1/2 inch (12 mm) over top of lath at tooled joints.
- F. Pot Life: Do not apply materials that have been discharged from mixed longer than 30 minutes.
- G. After initial application of limestone veneer, allow surface to set-up sufficiently to allow proper application of texture, coursing, and colorant.
- H. Test surface with veneer with moisture meter to determine optimal time for application of field applied sprayed colorants.
- I. Moist-cure finished work in accordance with manufacturer's recommendations.

3.06 CUTTING AND PATCHING

- A. Cut, patch, replace, repair, and point-up work as necessary to accommodate other

work. Repair cracks and indented surfaces. Point-up surfaces around items that are built into or penetrate limestone surfaces.

- B. Repair or replace work to eliminate cracking, dry outs, efflorescence, and similar defects. Repair or replace work as necessary to comply with required visual effects

3.07 LEANING AND PROTECTING

- A. Remove temporary covering and other provisions made to minimize spattering of limestone veneer on other work. Promptly remove over-spray from door frames, windows, and other surfaces. Repair surfaces stained, marred or otherwise damaged during work. When work is completed, remove unused materials, containers, equipment, and debris.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer that ensure work is without damage or deterioration at the time of Substantial Completion

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. Furnishing of all labor, materials, tools, equipment and services necessary for and reasonably incidental to the complete fabrication, delivery and erection of all structural steel shown on the drawings and/or hereinafter specified.
- B. Items in general are:
 - 1. Steel lintels.
- C. Include painting as hereinafter specified.

1.03 RELATED SECTIONS

- A. Miscellaneous lintels to be installed in masonry shall be by the masonry contractor but in accordance with this specification.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Steel for all structural shapes shall conform with the requirements of ASTM Specifications A-36. All lintels shall be galvanized steel.
- B. Shop painting: Tnemec #99-G or paint conforming to Steel Structures Painting Council Specification No. 15-68T, Type 1.

2.02 STEEL SECTIONS

- A. Steel lintels for openings, where shown or needed shall be of size noted on the drawings and have a 6" bearing at each end unless otherwise shown. Bolt or weld lintels together where required and tap to receive other work. Provide lintels over all exterior and interior openings in masonry walls as required. This shall include openings for louvers, ducts, vents, etc. Provide as follows for each 4" of masonry (6" minimum bearing, each end) over openings not otherwise noted:

Openings: 18" or less	3/8" x 2" flat bars	
	19" to 3'-6"	3-1/2" x 3-1/2" x 1/4" angle
	3'-7" to 5'-0"	4" x 3-1/2" x 1/4" angle LLV
	5'-1" to 6'-0"	5" x 3-1/2" x 1/4" angle LLV

- B. Provide structural steel lintels, beams, angles, and columns and angle supports of standard size as indicated on the drawings. Punch as required for fastening of other materials from information furnished by the General Contractor.

PART 3 EXECUTION

3.01 FABRICATION

- A. All fabrication shall be in accordance with shop drawings as approved by the Architect. Shop connections shall be as shown on plans or as approved by the Architect.
- B. Welding shall be in accordance with D1-1, Structural Welding Code and D12.1, Reinforcing Steel Welding Code by AWS.
- C. Main steel members furnished in one piece without splicing, except per drawings.
- D. Design connections not shown on drawings are responsibility of steel fabricator.
- E. Remove all cracks, parasites, slag inclusions, incomplete fusions and incomplete penetrations over 1/2" long in any 12" length of weld and reweld.
- F. Welding by carbon dioxide process not permitted unless specifically prequalified.
- G. Mill ends of members in direct bearing.

3.02 SHOP FINISH

- A. Prepare surfaces before painting in accordance with Steel Structures Painting Council "Surface Preparation Specifications SP2-63".
- B. Finish all steel with minimum 2 mil dry thickness shop coat, unless noted.
- C. Do not shop coat surfaces within 2" of field welds.
- D. Provide one coat shop finish on exterior lintels and other exterior members inaccessible after erection.

3.03 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor.

END OF SECTION

SECTION 05 52 00
RAILINGS AND COLUMNS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for all prefinished railing and column work shown on the drawings and specified hereinafter. Columns to be installed by Rough Carpenter. Railings to be installed by Railing Contractor or Finish Carpenter.
- B. It is intended that all railing work be complete in every respect. Material or work not specifically mentioned herein or indicated on drawings and not furnished by others but required to complete the work shall be furnished by this subcontractor.
- C. Verify field conditions, take necessary field measurements and be responsible for coordination of installation.

1.03 RELATED SECTIONS

- A. Wood Trim, Decks & Blocking: Division 6.

1.04 SHOP DRAWINGS

- A. Immediately upon receipt of a contract this subcontractor shall submit shop drawings for approval. Submittals shall include finish and color samples, a sample railing section, and drawings showing construction of all parts, joining details, fasteners, etc.
- B. All railing parts and assemblies shall comply with all applicable codes. The shop drawings shall contain a certification, stamped by the Registered Engineer, that the railing assemblies comply with all applicable provisions of the code for vertical, impact and lateral forces.

PART 2 PRODUCTS

2.01 MATERIALS - RAILINGS

- A. All railings shall be Series 990 Heavy Duty as manufactured by Superior Aluminum Products, Inc., or approved equal.
- B. All material shall be prime aluminum extruded from 6063 T-5 alloy with the following exceptions:
 - 1. 2" posts will be 6063 T-6.
 - 2. 1-1/2" posts will be 6061 T-6.
 - 3. All fasteners will be 400 series stainless steel.

- 4. Pickets 1 1/2"x 3/4" at 5 1/4" O.G.
- 5. 902 Top Rail
- C. All railings shall be shop fabricated in accordance with the highest industry standard. Post sections will be spaced as shown on drawings and will provide a minimum safe working load of 50 pounds per linear foot of railing. Pickets will be spaced a maximum 4-1/2" on center and will be a minimum of 3/4" square such that a 4" diameter sphere cannot pass thru.
- D. All railing sections and components shall withstand the design loads of applicable codes with a factor of safety of 2.0 based on the ultimate strength of the alloy used.
- E. All railings shall withstand all loads as required by the state and local governing agencies. Railings around stairwells, balconies, and other floor openings, both exterior and interior, shall be designed to resist a load of at least two hundred (200) pounds applied in any direction at any point of the top rail and also a vertical and a horizontal thrust of fifty (50) pounds per lineal foot applied at the top railing. The concentrated load and distributed loads need not be assumed to act concurrently. Anchorage of railing to the structure shall be capable of developing the design loads increased by an impact factor of 100% without failure.
- F. All railings and accessory pieces shall be electroplated with a thermo setting acrylic enamel (white) in order to achieve a uniform coating throughout. This coating shall meet the current AAMA Specification for paint finish. Shop fabricated railings shall be shop primed and field painted a final coat after installation.
- G. Units shall comply with applicable Fair Housing and ADA Standards.

2.02 MATERIALS - COLUMNS

- A. All prefinished columns shall be 6" and 8" square load-bearing or two piece snap around decorative, aluminum columns as manufactured by Superior Aluminum or approved equal. Columns shall be standard design with standard cap and base. Provide bearing plates for cap of column as supplied by Superior.
- B. Fasteners for wind uplift shall be as supplied by Superior Aluminum and shall be approved by Superior. Materials shall be compatible with aluminum.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All railings shall be installed in accordance with the drawings and manufacturer's details. All necessary assembly fasteners shall be furnished by the manufacturer. Installation fasteners except tapcons into concrete patios shall be furnished by the erection contractor. Anchor post into wood or concrete structure with lag screws or concrete expansion anchors. Anchors are to be compatible with aluminum. Size is per manufacturer.
- B. Columns shall be shipped in standard lengths. Columns shall be measured and field cut to fit tight under headers as shown. (Header shall be temporarily supported by others.) Slide cap and base over column and move into place. Install bearing plate, plumb column and anchor column to concrete and wood header to resist uplift. Slide base and cap over fasteners and fix in place with a set screw if required. Remove temporary support and recheck installation. Installation shall be by Rough Carpenter.

3.02 CLEAN UP

- A. This contractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floor broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. All boxes shall be broken down prior to placing in dumpsters.

END OF SECTION

SECTION 05 58 00

MISCELLANEOUS METALS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary to perform all miscellaneous metal work as shown on the drawings and specified hereinafter. Some items of work included are:
 - 1. Barrier posts.
- B. It is intended that miscellaneous metals be complete in every respect. Material or work not specifically mentioned herein or indicated on drawings and not furnished by another subcontractor, but necessary to complete work, shall be furnished by this subcontractor.
- C. Verify field conditions, take necessary field measurements and be responsible for coordination of installations.

1.03 RELATED SECTIONS

- A. Structural Steel: Section 05 12 00

PART 2 PRODUCTS

2.01 MATERIALS

- A. Barrier posts shall be 4" diameter, double strength steel posts as shown on the drawings.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Barrier posts shall be installed in concrete post holes as shown on the drawings.

3.02 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work, and as work progresses, or upon request by the General Contractor, he shall remove such debris and unusable materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor.

END OF SECTION

SECTION 06 11 00

WOOD FRAMING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment, and services necessary for all wood framing work as shown on the drawings and hereinafter specified.
- B. Some items of work included, without restricting the generality of the word "extent" are:
 - 1. All 2x wood stud wall framing including joists, headers, rafters, furring strips, miscellaneous blocking for other trades.
 - 2. Coordinate installation of anchor bolts and truss anchors for 2x wood stud framing.
 - 3. Provide and install all necessary rough carpentry hardware.
 - 4. Install temporary guards, barricades, and handrails as required by OSHA for safety.
 - 5. Install wood floor trusses, roof trusses and all bridging, braces, strongbacks and ribbon boards.

1.03 RELATED SECTIONS

- A. Insulation: Section 07 21 00
- B. Roof Shingles and Sheet Metal: Division 7
- C. Siding: Division 7
- D. Caulking: Division 7
- E. Windows: Division 8
- F. Entry Doors: Division 8
- G. Roof Trusses: Section 06 17 53 (A)
- H. Weather Barrier: Section 07 25 00
- I. Floor Trusses: Section 06 17 53 (B)

1.04 QUALITY ASSURANCE

- A. All framing and structural lumber shall be kiln dried and graded in accordance with Western Woods Products Association "Standard Grading Rules for Western Lumber", the Southern Forest Products Association, and National Design Specification for Wood Construction.
- B. Subfloor, roof sheathing, and wall sheathing shall be rated and stamped in accordance with APA requirements.

1.05 SUBMITTALS

- A. Immediately upon receipt of a contract this subcontractor shall forward submittals for approval. Any proposed substitutions shall be submitted along with test data and structural ratings.

PART 2 PRODUCTS

2.01 DIMENSIONAL LUMBER

- A. 2x4's and 2 X 6's: Stud grade SPF (Spruce-Pine-Fur). Compression parallel to grain: 425 psi. Compression perpendicular to grain: 265 psi.
- B. 2x's for joists, beams and headers shall be based on the following wood specification:

Species: Southern Pine

Commercial Grade: No. 2

Size Classification: 2-4" thick, 5" and wider

Fb single member: 1200 psi

Fb repetitive member: 1400 psi

Ft tension parallel to grain: 625 psi

Fv horizontal shear: 90 psi

Fc compression perpendicular to grain: 565 psi

Fc compression parallel to grain: 1000 psi

E modules of elasticity: 1,600,000 psi

Please Note: Some beams and headers may be of different species and commercial grade with greater structural specifications. Refer to framing plans and structural specifications for locations of structural components where higher grade members have been used.

- C. Moisture content: All lumber shall be (kiln dried) seasoned to 19% when stock is surfaced. Marking requirements (MC 19).

- D. Grading: Western Wood Products Association grading rule book, "Standard Grading Rules for Western Lumber", or National Design Specifications.
- E. Grade Marking: Each piece of lumber shall have the stamp showing mill grade, species, and moisture content.
- F. Wood members used as temporary guards and railings shall be construction grade new material. No used lumber will be acceptable for any portion of this work.

2.02 PARTITIONS

- A. All interior stud walls shall be 2x4's at 16" O.C. Exterior walls shall be 2 X 6's @ 16" O.C.
- B. The top plates of all bearing and non-bearing partitions shall be doubled and overlapped. All sole plates on walls at slab on grade shall be pressure treated (Wolmanized).

2.03 BLOCKING

- A. Furring, stripping and 2x blocking required for proper placement and attachment of all millwork, drywall and sheathing, handrails, bath accessories, grab bars, shower rods, drapery rods, fire extinguishers, tub access and ceiling access panels, etc. and work of other trades shall be furnished and installed level and true to line. Consult the enlarged architectural plans and the interior elevations for locations of most items.

2.04 FASTENERS

- A. Fasteners (nails, bolts, anchor bolts, etc.) shall be galvanized, electro-plated, or aluminum or other non-staining or non-corrosive material for exterior work.

2.05 JOIST & TRUSS HANGERS

- A. Joist and truss hangers shall be pocket type by Cleveland Steel Specialty Company, Simpson Company, or Timber Engineering Company and located as shown and noted on the drawings.

2.06 PRESERVATIVE TREATED LUMBER (WOLMANIZED)

- A. Preservative material and method: AWPA Standard C2-7D, for above ground use. In addition, water born salts treated wood shall bear the AWPA quality mark designation LP-2.
- B. Process: "Osmose K-33" by Osmose Wood Preserving Co. of America; "Wolmanized" process by Koppers Company, Inc., or approved equal. Creosote treated products are not acceptable.
- C. Drying: After preservative treatment, the material shall be kiln dried to a moisture content not over 19% and stamped "Dry".
- D. Preservative material for job site treatment of field cuts: Same as for pressure treatment.

2.07 SILL SEALER

- A. Sill sealer shall be 1" x 3-5/8" fiberglass strips run continuous under all exterior wall sill plates. Materials shall be manufactured by Owens Corning, Certainteed, Johns-Manville

or approved equal.

PART 3 EXECUTION

3.01 GENERAL

- A. Per drawings and as required to complete work, wood partitions shall be set straight and plumb, securely anchored top and bottom. Use only new material for permanent installation.
- B. Furring, stripping, and 2x blocking required for proper placement and attachment of all millwork, drywall and sheathing, kitchen cabinets, bath accessories, handrails, grab bars, medicine cabinets, drapery rods, etc., and work of other trades, shall be furnished and installed level and true to line. Consult the enlarged architectural plans and the interior elevations for location of most items.
- C. Lay out work carefully. Cut and set material to fit accurately. Align, level, plumb and brace work in proper position. Level joists, beams and girders on masonry or concrete with steel shims. Do not use shims on wood or metal bearings.
- D. Sort framing material to suit its placement so that the permitted defects will have the least detrimental effect on the stability and appearance of the work. Avoid large or unsound knots at connections. Discard excessively warped or otherwise defective material.
- E. Install wood framing members in as long lengths as practicable on centers as shown. Do not splice structural members between supports. Use straight members at corners.
- F. Frame openings for passage of ducts and pipes and to accommodate work of other trades. Provide blocking for finishes, accessories and equipment and to support ends and edges of all square edged plywood roof sheathing.
- G. Fasten all parts of rough carpentry work rigidly in their proper places. Drive nails and spikes home, and pull bolt nuts tight with heads and washers in close contact with the work. Nail siding per manufacturer's directions.
- H. Construct assemblies which support dead loads and live loads, or combinations thereof, and spike or nail in conformance with "Manual for House Framing", latest edition, published by National Forest Products Association, applicable state and local codes, and as detailed on drawings for typical and specific conditions.
- I. Firestop concealed spaces with wood blocking not less than 2" thick, (nominal) if not blocked by other framing members. Provide blocking at each building story level, at ends of joist spans and elsewhere as required by code.

3.02 PRESSURE-TREATED MATERIALS

- A. Use pressure preservative-treated wood for nailers, blocking, sleepers, sill plates, grounds and framing in direct contact with exterior concrete or masonry walls; including exterior sides, tops and edges of masonry wythes of exterior walls, even though separated by fillers, seals, membranes and the like; and wood elsewhere shown as treated, except where fire-retardant treated wood is required.
 - 1. Pressure-treated wood must be separated from contact with aluminum.

2. All balcony framing and decking is to be pressure treated.

3.03 SILL PLATES

- A. Anchors in concrete: Shoot sill plate for all interior partitions to concrete. Use a nail and shot designed to hold the plates securely in place.
- B. Anchor Bolts: To be installed by Concrete Contractor. Place bolts as indicated on drawings or minimum of 48" on center, 12" from each end with a minimum of two (2) anchors in each sill plate.
- C. Set sill plates level and square and anchor to foundation wall. Grouting shall be provided under the sill if necessary to maintain solid bearing. Tighten all nuts securing sills and do not enclose construction until anchorage has been verified.
- D. Sealing: Install continuous glass fiber sealer strip under all sill plates.

3.04 PARTITION FRAMING

- A. Select studs for straightness.
- B. Stud spacing shall be 16" on center for all bearing and non-bearing partitions.
- C. Provide continuous single bottom plate for all partitions, double top plates for bearing partitions, and for non-load-bearing partitions. (Stagger joints a minimum of 4'-0"). Nail or anchor the plates to supporting construction. Overlap double top plates at wall intersections. Bottom plate on all partitions in contact with concrete or masonry shall be pressure treated.
- D. Consult framing drawings for special conditions for jack and header studs and header size. Other openings not listed shall have double studs at each side. Construct headers with framing member sizes listed with 1/2" plywood flitch plate.
- E. Any walls 9'-0" or greater in height shall be balloon framed with length of material as required.

3.05 WOOD BEAMS AND GIRDERS

- A. Fabricate beams and girders according to details. Use only lumber free of checks, cracks and splits.
- B. Set beams and girders level and in alignment with other work.
- C. Provide minimum 4" bearing on walls or supports unless otherwise shown.
- D. Bolt or spike members together at joints and splices of beams and girders. Locate joints only over supports.

3.06 CONVENTIONAL ROOF FRAMING

- A. Provide ceiling and roof rafters for all areas requiring conventional framing of 2x dimensional lumber as listed (2 x 6 minimum).

- B. Notch rafter to fit exterior wall plates and toe nail, or use metal framing anchors. All hip framing shall be double mitered and toe nailed to ridge rafters. Double rafters to form headers and trimmers at openings in roof framing (as shown) and support with metal joist hangers.
- C. Crickets: Provide crickets where shown, constructed with roof sheathing material for adjoining roof deck and blocking to form smooth sloping surfaces and true intersections.

3.07 CUTTING OF JOISTS (2 x's only)

- A. To facilitate the installation of piping and ductwork cutting will be permitted with the following limitations:
 - 1. No notching in middle third of span, top or bottom may be notched not more than 1/6 the depth in end thirds of span.
 - 2. Holes drilled through joists to permit piping shall not be larger than 2-1/4" diameter, not more than 1/2" larger than outside diameter of pipe, and shall have edge clearance top and bottom of at least two inches (2").

3.08 INSTALLING NAILERS, BLOCKING, GROUNDS AND FURRING

- A. General: Provide nailers, blocking, grounds, furring, nailing strips, cant strips, crickets, and other framing members of sizes and types required for conditions shown. Select and locate items for accuracy.
- B. Nailers: Provide nailers of 2" stock, unless otherwise shown, bolted in place. Where bolt sizes and spacing are not otherwise shown, use not less than 3/8" bolts at 32" staggered. Exterior nailers shall be of preservative-treated lumber.
- C. Blocking: Provide wood blocking of sizes and shapes and in locations as necessary for the installation and attachment of wood, gypsum wallboard, and other finishes, stair handrail brackets, medicine cabinets, bath and toilet accessories, mail boxes, shades, drapery rods, electric panels, lavatories, light fixtures, fireplace mantles, equipment and other specialty items. Provide secure blocking on all sides of openings and recesses. Coordinate work with other trades for proper locations. Firestop concealed spaces with wood blocking not less than 2" thick, if not blocked by framing members.
- D. Firestop concealed spaces with wood blocking (or safing insulation) not less than 2" thick, if not blocked by framing members. Firestopping shall be arranged to cut off all concealed draft openings and form an effectual horizontal and vertical fire barrier between stored and roof spaces. Firestopping shall be installed in accordance with the state and city building code requirements.

3.09 TEMPORARY GUARDS INSTALLATION

- A. All wood members used for temporary guards and railings shall be construction grade new wood. No used lumber will be acceptable for building guards and railings. Railings and guards may be moved from one building to the next and reused as long as material is in "good" condition and structurally sound.
- B. All temporary braces, guards, and railings shall be installed in accordance with OSHA safety requirements to withstand applicable loads. Coordinate locations with General Contractor.

3.10 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work, and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. All boxes shall be broken down prior to placing in dumpster.

END OF SECTION

SECTION 06 16 00

SHEATHING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment, and services necessary for all sheathing work as shown on the drawings and hereinafter specified.
- B. Some items of work included, without restricting the generality of the word "extent" are:
 - 1. Subfloor, wall, and roof sheathing, and draftstopping.

1.03 RELATED SECTIONS

- A. Insulation: Section 07 21 00
- B. Roof Shingles and Sheet Metal: Section 07 31 13
- C. Siding: Section 07 46 23
- D. Caulking: Section 07 92 00
- E. Windows: Section 08 53 13
- F. Entry Doors: Section 08 16 13
- G. Roof Trusses: Section 06 17 53 (A)
- H. Lightweight Concrete Floor Fill: Section 03 34 00
- I. Floor Trusses: Section 06 17 53 (B)
- J. Weather Barrier: Section 07 25 00

1.04 QUALITY ASSURANCE

- A. Subfloor, roof sheathing, and wall sheathing shall be rated and stamped in accordance with APA requirements.

1.05 SUBMITTALS

- A. Immediately upon receipt of a contract this subcontractor shall forward submittals for approval. Any proposed substitutions shall be submitted along with test data and structural ratings.

PART 2 PRODUCTS

2.01 SUBFLOOR

- A. All floor joists shall be covered with APA rated for span 3/4" Sturdi floor OSB board by LP or approved equal.
- B. Construction adhesive shall be exterior grade by Franklin or approved equal.

2.02 WALL & ROOF SHEATHING

- A. All roof sheathing and some wall sheathing as shown on the drawings shall be 7/16" OSB board C-D, 32/16, interior, PSI with exterior glue as graded by the American Plywood Association or approved equal and shall conform to PS2-92. Panels shall be APA rated for span and load required. Provide clips if used for roof sheathing.
- B. Roof sheathing within 4'-0" each side of a firewall shall be "non-com" approved fire retardant 7/16" OSB material complying with the OBC requirements. The material shall be impregnated with a chemical by pressure process in accordance with AWPA C20 and AWPA C27 and shall have, when tested in accordance with ASTM E84, a listed frame spread of 25 or less and show no evidence of significant progressive combustion for an additional 20 minutes and shall not have allowed the flame front to progress more than 10.5 feet beyond the centerline of the burners.

2.03 INSULATED WALL SHEATHING

- A. Insulated wall sheathing shall be Zip insulated sheathing, 1 1/2", R=6.6. Panels shall be 11/16" structural 1, 24/16 with integral insulation. Nailing shall be 10d (0.131 shank nail)
- B. Flashing tape shall be by Zip and appropriate for the location. Nailing shall be as required and approved by Zip. Zip system shall meet code requirements as a structural panel, water-resistive and air barrier per documented testing by ICC Elevation Services.

2.04 SHEARWALL SHEATHING

- A. Shearwall sheathing shall be T&G or square edged OSB or plywood, APA rated as called out on drawings. Nailing shall be called out on drawings. (Typically 4" o.c. at edges and 8" in the field)

2.05 DRAFTSTOPPING

- A. Draftstopping in floor truss space shall be 7/16" OSB plywood sheathing. Material shall be 48" X 96" and shall be installed in areas as shown on the drawings and required by code. Drywall on attic party walls shall be supplied to the carpenter by the drywall contractor for any areas where installation by carpenter is required.

PART 3 EXECUTION

3.01 WALL SHEATHING

- A. Insulated wall sheathing shall be installed per Zip requirements. Minimum 10d galvanized (0.131 ring shank nail) Nailing to be 4" o.c. at edges and 8" o.c. in field unless noted differently on the drawings. SL
- B. Sheathing shall be applied vertically with long edges parallel to framing members. All joints shall center over framing. Nailing shall be 8" o.c. for intermediate framing and 4" o.c. for edges. Drive nail heads flush with surface. Nailing must meet manufacturer's requirements for structural wall wind bracing.

3.02 ROOF SHEATHING

- A. Install with face grain across rafter or truss supports and panels continuous over two or more spans.
- B. Stagger the panel end joints of adjacent rows. Locate end joints over center lines of supports, allowing 1/16" space between panel ends.
- C. Nail roof and floor as per APA requirements and, if not specified, nail sheathing 6" on centers at supported end and 12" on centers over intermediate supports. Use 6d common or 5d threaded nails for 1/2" thick. Staples are not acceptable.
- D. Install "non-com" fire retardant treated plywood a minimum of 4'-0" each side of the firewalls. Plywood shall be staggered 4'-0", 6'-0", etc. back and forth on trusses to maintain 4'-0" min.

3.03 SUB-FLOOR INSTALLATION

- A. Subfloor shall be laid with outer piles at right angles to the joists. Stagger end panels so that end joints in adjacent panels break over different joists.
- B. Sub-floor shall be set in a full bead of construction adhesive. Nail sub-floor to joists at each bearing point with 8d threaded nails spaced 6" O.C. along all edges and at 10" O.C. along intermediate members. If power nailing is used, nails must be threaded or ring shank. Standard 6d box or common nails are not acceptable. Each sheet shall be nailed completely before glue sets up. (It is not acceptable to tack sheets in place and then complete nailing of field at a later time.)

3.04 DRAFTSTOPPING AND ATTIC PARTY WALL DRYWALL

- A. Plywood sheathing or 2x blocking shall be installed as draftstopping in floor space, and connections between stud spaces and floor/ceiling/attic areas as shown. Sheathing shall be adequately nailed at 6" O.C. along edge and 10" O.C. in field. Material may be attached to trusses while still on the ground and then hoisted into place or installed after trusses are set. All butt joints shall be back blocked as required or taped to seal openings.
- B. In all locations shown on the drawings where drywall is nailed over a 2x4 flat wall installed sandwiched in the split trusses system or where a gable truss or ladder panel is shown drywalled and sandwiched in the roof or floor system, the carpenter shall install the drywall (provided by drywall subcontractor) as the trusses are being set. Any areas where drywall can be installed after roofing is complete shall be installed by the drywall contractor.

3.05 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work, and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. All boxes shall be broken down prior to placing in dumpster.

END OF SECTION

SECTION 06 17 53 (A)

ROOF TRUSSES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment, and services necessary for all wood roof truss work as shown on the drawings and hereinafter specified.
- B. All joist and truss hangers as required for design and loads and as shown on shop drawings. (Installation by carpenter)

1.03 RELATED SECTIONS

- A. Wood Framing: Section 06 11 00
- B. Sheathing: Section 06 16 00

1.04 QUALITY ASSURANCE

- A. Metal plate connected wood truss design shall conform to "Design Specifications for Light Metal Plate Connected Wood Trusses" published by Truss Plate Institute (TPI), current edition, and local building code.
 - 1. Trusses shall be designed to resist the dead loads of completed construction and the design snow load and wind uplift loads required. Anchorage for the trusses shall be designed for specified wind uplift load less dead load. (Loads listed on drawings shall control if higher than code requirements.)
 - 2. Snow loads shall be assumed to be one month duration.
- B. Wood structural design shall conform to the "National Design Specification for Wood Construction" published by National Forest Products Association (NFPA).
- C. Lumber utilized shall be stress graded, kiln dried, and shall bear grade mark of a recognized inspection agency, and shall conform to rules and service requirements of American Lumber Standards Committee and PS-20.
- D. Truss fabrication standard: TPI Quality Control Manual.
- E. Fabricator's qualifications: Manufacturer shall be regularly engaged in producing type of trusses specified, and shall have at least three years experience in successful fabrication of trusses comparable to type shown for this project. Fabricator to be approved by Architect.
- F. Bracing: Install wood trusses according to Building Component Safety Information BCSI

ROOF TRUSSES

06 17 53-1

as published by Truss Plate Institute (TPI).

1.05 SUBMITTALS

- A. Shop drawings and product criteria: Submit shop drawings, material description, design criteria, stress computations, designed deflection and other information for review, including but not limited to the following:
 - 1. Shop fabrication and erection details; temporary and permanent bracing or bridging.
 - 2. Configuration, pitch, span, spacing, and camber for each type of truss.
 - 3. Design loadings and their application to the trusses; load duration factors.
 - 4. Stress diagrams; allowable design unit stresses.
 - 5. Lumber size, species and grade for each member of the truss. (All lumber to be kiln dried.)
 - 6. Metal connector plate data, including type, gauge, size, description and location of each connector and the type, size and number of nails required to be used with the plate.
 - 7. Length of bearing required; anchorage details.
 - 8. Truss design identification and location mark to show location of each truss in the structure.
- B. Submit shop drawings and calculations signed and stamped by a Structural Engineer licensed in the state where trusses are to be installed.
- C. Submit fabricator's specifications and installation instructions for required work, covering lumber, metal plates, hardware, fabrication, treatment (if any), handling and erection.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Time the delivery and erection of trusses to avoid extended on site storage and delay of subsequent work.
- B. Handle and store trusses with care, according to TPI recommendations and manufacturer's instructions, to avoid damage from bending, turning over, or other cause for which the truss is not designed.
- C. If extended site storage cannot be avoided, store trusses above grade and in a manner protected from exposure to the elements.

PART 2 PRODUCTS

2.01 WOOD MATERIALS

- A. Truss lumber
 - 1. Sizes: Nominal sizes are shown except as shown by detail dimensions. Provide

actual sizes as required by PS-20 for dressed lumber, S4S, unless otherwise shown.

2. Condition: Kiln dried lumber with 19% maximum moisture content at time of dressing.
 3. Species: Southern pine or approved equal.
 4. Grade: Any stress rated grade fulfilling requirements shown on drawings for species, stress ratings and moisture content.
- B. Permanent bridging: stress grade lumber, conforming to PS-20 and requirements specified under ROUGH CARPENTRY.

2.02 CONNECTORS AND ANCHORAGE

- A. Connector plates: Metal, not less than .036" thick, conforming to TPI Design Specifications.
1. Galvanized steel: ASTM A653, Grade A, Coating G60; or ASTM A591, Coating Class C with minimum structural quality equal to ASTM A446, Grade A.
- B. Fasteners and anchorage: Galvanized steel conforming to applicable federal specifications for mills, screws, bolts, nuts, washers and anchor devices.

2.03 FABRICATION OF METAL PLATE CONNECTED TRUSSES

- A. Cut truss members to accurate lengths, angles and sizes to produce close fitting joints with designed wood to wood bearing in assembled units.
- B. Use metal connector plates designed for types of joints and stresses required. Locate accurately and fasten securely.
- C. Carefully assemble trusses in precision jigs, to assure uniformity and accuracy, and to provide alignment and full bearing of wood members. Position members to produce design camber shown.
- D. Mark trusses according to the approved truss layout to show locations in structure.

PART 3 EXECUTION

3.01 HANDLING

- A. Hoist units into place by means of lifting equipment suited to sizes and types of trusses required, applied at lift points recommended by fabricator, to prevent over stressing members and joints.
- B. Exercise care not to damage truss members or joints by out of plane bending or other causes.

3.02 ERECTION

- A. Erect and brace trusses to conform to recommendations of the manufacturer and the Truss Plate Institute.

- B. Erect trusses with plane of truss webs vertical (plumb) and parallel to each other, located accurately at design spacings shown to form true roof planes, and straight ridges, hips and valleys.
- C. The second truss of doubled trusses may be installed after placement of all trusses at normal spacing required.
- D. Provide temporary erection bracing to maintain trusses plumb and in correct locations until permanent bracing is installed.
- E. Anchor trusses to side of supporting plates or framing with 16d sinkers except in locations where truss anchors are shown on the drawings.
- F. Install permanent bracing and related components to enable trusses to withstand live and dead loads, including lateral loads, and comply with other indicated requirements.
- G. Do not cut or remove truss members.

END OF SECTION

SECTION 06 17 53 (B)

OPEN WEB FLOOR TRUSSES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment, and services necessary for all wood roof truss work as shown on the drawings and hereinafter specified.
- B. All joist and truss hangers as required for design and loads and as shown on shop drawings. (Installation by carpenter)

1.03 RELATED SECTIONS

- A. Wood Framing: Section 06 11 00
- B. Roof Trusses: Section 06 17 53 (A)
- C. Lightweight Concrete: Section 03 34 00

1.04 QUALITY ASSURANCE

- A. Metal plate connected wood truss design shall conform to "Design Specifications for Light Metal Plate Connected Wood Trusses" published by Truss Plate Institute (TPI), current edition, and local building code.
 - 1. Trusses shall be designed to resist the dead loads of completed construction and the design snow load and wind uplift loads required. Anchorage for the trusses shall be designed for specified wind uplift load less dead load. (Loads listed on drawings shall control if higher than code requirements.)
 - 2. Snow loads shall be assumed to be one month duration.
- B. Wood structural design shall conform to the "National Design Specification for Wood Construction" published by National Forest Products Association (NFPA).
- C. Lumber utilized shall be stress graded, kiln dried, and shall bear grade mark of a recognized inspection agency, and shall conform to rules and service requirements of American Lumber Standards Committee and PS-20.
- D. Truss fabrication standard: TPI Quality Control Manual.
- E. Fabricator's qualifications: Manufacturer shall be regularly engaged in producing type of trusses specified, and shall have at least three years' experience in successful fabrication of trusses comparable to type shown for this project. Fabricator to be approved by Architect.

- F. Bracing: Install wood trusses according to Building Component Safety Information BCSI as published by Truss Plate Institute (TPI).

1.05 SUBMITTALS

- A. Shop drawings and product criteria: Submit shop drawings, material description, design criteria, stress computations, designed deflection and other information for review, including but not limited to the following:
 - 1. Shop fabrication and erection details; temporary and permanent bracing or bridging.
 - 2. Configuration, pitch, span, spacing, and camber for each type of truss.
 - 3. Design loadings and their application to the trusses; load duration factors.
 - 4. Stress diagrams; allowable design unit stresses.
 - 5. Lumber size, species and grade for each member of the truss. (All lumber to be kiln dried.)
 - 6. Metal connector plate data, including type, gauge, size, description and location of each connector and the type, size and number of nails required to be used with the plate.
 - 7. Length of bearing required; anchorage details.
 - 8. Truss design identification and location mark to show location of each truss in the structure.
- B. Submit shop drawings and calculations signed and stamped by a Structural Engineer licensed in the state where trusses are to be installed.
- C. Submit fabricator's specifications and installation instructions for required work, covering lumber, metal plates, hardware, fabrication, treatment (if any), handling and erection.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Time the delivery and erection of trusses to avoid extended on site storage and delay of subsequent work.
- B. Handle and store trusses with care, according to TPI recommendations and manufacturer's instructions, to avoid damage from bending, turning over, or other cause for which the truss is not designed.
- C. If extended site storage cannot be avoided, store trusses above grade and in a manner protected from exposure to the elements.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Open web joists shall be shop fabricated units as manufactured by an approved truss

manufacturer. Open web or plywood web joists by Truss Joist Corporation shall also be considered an approved equal substitution.

- B. Trusses shall be fastened on both sides with galvanized connector plates conforming to TPI Design Specifications.
- C. Floor truss units shall be shop assembled so that wood members have full bearing; toggle clamps shall hold the joints in proper position while plates are positioned and the truss is then passed through a press that forces the plates into the wood members so that full penetration of the teeth is obtained without crushing the outer surface of the wood.
- D. Lumber for trusses shall be kiln dried Douglas fir, hem fir, or southern yellow pine or equivalent stress graded species indicated in "National Design Specification for Stress Grade Lumber and its Fastening" recommendations. Lumber members shall be sized as shown on the drawings.

2.02 ACCESSORY ITEMS

- A. Bridging shall be installed as required by code and the manufacturer. In general, bridging shall be a continuous strong back 2 x 4 at mid span as shown on the drawings with a continuous 2 x 4 bridging "ribbon board" at the exterior wall.
- B. Joist hangers shall be installed in locations shown on the drawings and shall be the type and manufacturer supplied by the wood joist manufacturer.
- C. Provide 2 x 4 vertical blocking jacks at all locations where concentrated loads from above do not fall over a joist. See drawings for locations and conditions.

PART 3 EXECUTION

3.01 HANDLING

- A. Hoist units into place by means of lifting equipment suited to sizes and types of trusses required, applied at lift points recommended by fabricator, to prevent over stressing members and joints.
- B. Exercise care not to damage truss members or joints by out of plane bending or other causes.

3.02 ERECTION

- A. Open web wood joists are to be erected and installed in accordance with the plans, any truss joist drawings and installation suggestions. Temporary construction loads which cause member stresses beyond design limits are not permitted. Erection bracing in addition to specified bridging is to be provided to keep the joists straight and plumb as required to assure adequate lateral support for the individual joists and the entire system until the sheathing material has been applied. The contractor will give notification prior to enclosing the joists to provide opportunity for inspection of the installation.

END OF SECTION

SECTION 06 20 13

EXTERIOR FINISH CARPENTRY

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for all exterior finish carpentry work as shown on the drawings and specified hereinafter.
- B. Some items of work included without restricting the generality of the word "extent" are:
 - 1. Provide and install all exterior wood trim.
 - 2. Install aluminum columns and railings.
 - 3. Install windows and entry doors.

1.03 RELATED SECTIONS

- A. Aluminum Columns: Section 05 52 00
- B. Finish hardware: Section 08 71 00
- C. Interior Finish Carpentry: Section 06 20 23
- D. Wood Framing: Section 06 11 00
- E. Exterior doors, windows and glazing: Division 8

1.04 SUBMITTALS

- A. Immediately upon receipt of a contract this subcontractor shall submit shop drawings for all milled interior trim shapes, etc. Drawings shall be full size and clearly dimensioned as to sizes, radius, routing, etc.

1.05 QUALITY ASSURANCE

- A. Grading of lumber: Each piece of finish lumber for painted finish shall be identified by a grade mark showing type, grade, mill and grading agency identification. Lumber for transparent finish shall be marked on concealed surface or furnished with mill certificate stating that material has been inspected and graded according to requirements. For bundled stock the grade mark may be applied only to each bundle.

1.06 DELIVERY AND STORAGE

- A. Protect finish carpentry during transit, delivery, and storage to prevent damage and soiling. Keep material dry.
- B. Do not deliver finish lumber or millwork to a building until concrete, masonry, and other wet work are dry.
- C. If wood materials must be stored in spaces other than installation areas, store only where exposure to extreme changes of temperature and humidity can be avoided.

PART 2 PRODUCTS

2.01 EXTERIOR TRIM

- A. All exterior trim shall be by Boral or Azek. Trim shall be smooth finish in sizes as shown on drawings. Nails shall be appropriate length galvanized finish nails, minimum 8d. Trim shall be primed and back primed.
- B. All nails for exterior work shall be galvanized finish or casing nails, length as required.

PART 3 EXECUTION

3.01 EXTERIOR TRIM

- A. General: Erect exterior finish woodwork as shown. Fasten woodwork with finish nails or finish screws as applicable and blind nail wherever practicable. Drive nails in a manner to avoid splitting.
- B. Exterior trim: Apply trim straight, plumb and level. Fit carefully and fasten with siding nails or screws. Use maximum available lengths of material and stagger joints of adjacent members. Lap wood corner trim as shown. Trim openings with closed butt corners.
- C. Skirt board trim shall be installed 5" above grade on all walls with vinyl siding. Trim shall be installed with the manufacturer's screws using the countersink bit provided. Plug all holes with the manufacturer's plug inserts.
 - 1. Install manufacturer's cap flashing prior to start of vinyl siding installation.

3.04 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 06 20 23

INTERIOR FINISH CARPENTRY

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for all interior finish carpentry as shown on the drawings and specified hereinafter.
- B. Some items of work included without restricting the generality of the word "extent" are:
 - 1. Install finish hardware.
 - 2. Provide and install interior trim. Install interior doors and hardware.
 - 3. Provide and install wood handrails and wood access panels as called out on the drawings.
 - 4. Provide and install all window stools.
 - 5. Install cabinetry and tops.
 - 6. Install bath accessories and fire extinguisher cabinets.
 - 7. Install exterior railings.

1.03 RELATED SECTIONS

- A. Finish hardware: Section 08 71 00
- B. Cabinets, vanities and countertops: Division 12
- C. Medicine cabinets and bath accessories: Division 10
- F. Interior doors: Section 08 14 00
- G. Fire extinguishers and cabinets: Division 10

1.04 SUBMITTALS

- A. Immediately upon receipt of a contract this subcontractor shall submit shop drawings for all milled interior trim shapes, etc. Drawings shall be full size and clearly dimensioned as to sizes, radius, routing, etc.

1.05 QUALITY ASSURANCE

- A. Grading of lumber: Each piece of finish lumber for painted finish shall be identified by a grade mark showing type, grade, mill and grading agency identification. Lumber for transparent finish shall be marked on concealed surface or furnished with mill certificate stating that material has been inspected and graded according to requirements. For bundled stock the grade mark may be applied only to each bundle.
- B. Grading of plywood: Each sheet of soft wood plywood shall bear the mark of a recognized or independent inspection agency that maintains continuing control over the quality of the plywood. The mark shall identify the plywood as to species, glue type, grade and compliance with the U. S. Product Standard P.S.I.

1.06 DELIVERY AND STORAGE

- A. Protect finish carpentry during transit, delivery, and storage to prevent damage and soiling. Keep material dry.
- B. Do not deliver finish lumber or millwork to a building until concrete, masonry, and other wet work are dry.
- C. If wood materials must be stored in spaces other than installation areas, store only where exposure to extreme changes of temperature and humidity can be avoided.

PART 2 PRODUCTS

2.01 INTERIOR TRIM

- A. All interior trim to be painted, shall be MDF shop primed and back primed. Finger-jointed material shall be considered an approved equal.
- B. Base shall be 7/16" x 3-1/4", stop 3/8" x 1-1/4", casing shall be 1/2" x 2-1/4" and crown shall be 5". All trim shall be "Colonial" style. Submit samples to Architect for approval.
- C. All trim shall be accurately fit into place and nailed firmly with finish nails, counter sunk and filled, length appropriate for material.
- D. Interior handrail shall be kiln dried poplar, clear white pine (style shown) or approved equal in accordance with details on drawings.

2.02 ACCESS PANELS

- A. Ceiling attic access panels shall be drywall with the cutout for the opening reused for the panel. Carpenter shall provide 3/4" OSB subfloor, plywood or sturdy floor panel to glue to top of drywall cut-out.

2.03 WINDOW STOOLS

- A. All window stools shall be 1/2" thick, synthetic cultured marble, or approved equal, sizes as shown on the drawings. Supplier shall submit samples for approval and color choice before ordering. Sill shall be installed before drywall with construction adhesive or manufacturer's approved adhesive. Sills shall be continuous with no seams. Spread adhesive evenly over the mounting surface, align sill with a slight sliding motion to assure

an even uniform bond, check for level and clamp by toe nailing into studs at ends.

PART 3 EXECUTION

3.01 INTERIOR TRIM

- A. General: Provide materials and sizes shown. Except for bases provide trim in single lengths. Provide base in pieces as long as possible. Miter moldings at exterior angles and cope at interior angles. Make joints tight and in a manner to conceal shrinkage. Fasten trim with finish nails or screws and set nails for putty. Set wood finish straight, plumb, level, in correct position and alignment and closely fitted to insure smooth finish surfaces. Sand finish work with the grain at field joints.

3.02 WINDOW STOOLS

- A. Window sills shall be continuous with no seams, in locations shown on the drawings. Spread adhesive evenly over mounting surface, align sill with a slight sliding motion to ensure an even uniform bond. Toe nail into studs to hold while drying as needed. Check for level, shim if necessary and clamp until dry.

3.03 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 06 43 00

WOOD STAIRS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. Provide and install wood stair unit.

1.03 RELATED SECTIONS

- A. Wood Framing: Section 06 11 00
- B. Sheathing: Section 06 16 00
- C. Light Weight Concrete: Sheathing 03 34 00

1.04 SUBMITTALS

- A. Shop drawings shall be submitted for shop-built stair units. Drawings shall show sizes, construction details, and types of lumber, gluing, blocking and routing details. Shop drawings shall be stamped by a Registered Engineer in the State of the project and shall contain a certification stating that the stair unit complies with the 100 pound live load and concentrated load requirements of the code.

PART 2 PRODUCTS

2.01 WOOD STAIRS

- A. Supply and install shop-built wood stair units as shown on drawings. All stairs shall be designed to carry 100 lbs. live load, per code.
- B. Stringer board shall be "select" quality, suitable for paint finish. (Fill and sand smooth any imperfections). Treads and risers shall be routed into stringers and glued.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Stair units shall be installed in accordance with the manufacturer's approved shop drawings and details and as shown on the drawings.
- B. Units shall be nailed with finish nails or small head box nails or finish screws. Fill nail holes and when possible, nail through risers or stringers where carpet will cover the nail heads.

END OF SECTION

**WOOD STAIRS
06 43 00-1**

SECTION 07 13 00

WATERPROOFING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A.** Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SUMMARY

- A.** Provide polymer-enhanced asphalt liquid-applied membrane for concrete foundation waterproofing.
- B.** Provide sheet waterproofing membrane system to be installed over top of the asphalt liquid-applied membrane to act as protection board and extra layer of waterproofing.

1.03 SUBMITTALS

- A.** Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

1.04 QUALITY ASSURANCE

- A.** Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 MATERIALS

- A.** Basis for Design Manufacturer: Tremco Barrier Solutions. 6402 E Main St, Reynoldsburg, Ohio 43068, Tel: 1-800-876-5624, web: www.tremcobarriersolutions.com
 - 1.** Type: Watchdog H3 Waterproofing, Polymer-enhanced asphalt liquid-applied membrane.
 - 2.** Color: Black
 - 3.** Solids: 64% ± 3% [percent by weight]
 - 4.** Density: 8.2 ± .15 lbs/gal
 - 5.** Application: Airless spray
 - 6.** Application Temperature: Minimum 20°F
 - 7.** Application Thickness: 60 mils (wet)
 - 8.** Typical Cure Time 16-24 hrs [under normal conditions]

- B.** Basis for Design Manufacturer: Cosella-Dorken, Delta: 4655 Delta Way, Beamsville, ON LOR 1B4, Canada: Tel: 1-905-563-3255, Fax: 1-905-563-5582 web: www.cosella-dorken.com
1. Type: DELTA-MS High-Density polyethylene (HDPE), Semi-rigid Membrane
 2. Color: Brown
 3. Dimple Height: 5/16"
 4. Working Temperature: -22°F to 176°F
 5. Compressive strength: 5200 psf
 6. Application: Mechanically fastened with fasteners approved by Cosella-Dorken, Nails must be used for cast-in-place concrete foundations.

PART 3 EXECUTION

3.01 INSTALLATION

- A.** Examine substrate; report unsatisfactory conditions in writing. Beginning work means acceptance of substrate. Begin work only after substrate construction and penetrating work is complete.
- B.** Clean and prepare substrate; prime if recommended by dampproofing manufacturer. Protect adjacent work and surfaces from spillage, migration, and damage.
- C.** Comply with manufacturer's instructions and recommendations including weather and temperature limitations. Install cant strips, reinforcing strips and other accessories as recommended by dampproofing manufacturer.
- D.** Apply dampproofing to achieve 40 mils dry film thickness, unless greater thickness is recommended by manufacturer based on project conditions.
- E.** The backfill of the foundation must be clean soil free of rocks or other deleterious materials and placed so as not to damage the foundation of the membrane system. The design and construction of the foundation is outside the scope of this section. Membranes must be backfilled within 30 days of its installation.

END OF SECTION

SECTION 07 21 00

INSULATION

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All Labor, materials, equipment and services necessary for performing all insulation work as shown on the drawings and specified hereinafter.

1.03 CERTIFICATION

- A. Upon receipt of a contract this contractor shall submit specification data sheets to the Architect on the insulation which certifies the "U" values of the proposed insulation. At the completion of the job this contractor shall provide the Owner and the Architect with certification that the insulation as installed in the building will provide the minimum "U" values listed below. Final payment of work will not be issued until certifications are received.

1.04 STORAGE AND HANDLING

- A. All materials shall be delivered to the job site in manufacturer's unopened cartons. All insulation shall be stored in a cool, dry area and care shall be taken that insulation is not damaged. Any damaged or wet insulation shall not be installed in the building and shall be removed from the job site.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Exterior wall insulation shall be 6" Kraft-faced friction fit insulation as manufactured by Owens Corning Fiberglas with approved equals by Johns-Manville and Certainteed. Insulation shall have an "R" value of 21.0.
- B. Interior party wall sound insulation shall be 3-1/2" Kraft paper faced insulation as manufactured by Owens Corning with equals listed above. Insulation shall provide a minimum rating of STC=45.
- C. Attic insulation for flat ceilings shall be fiberglass blown insulation. Material shall be installed in thickness and density to be certified as having an "R" value as shown on drawings. All insulation by Owens Corning, or approved equal. Listed above
- D. Insulation stops shall be constructed of scored corrugated cardboard or plastic, treated for resistance to weather. Units shall be precut and bent to fit 24" o.c. truss spacing.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Exterior stud wall Kraft-faced insulation shall be stapled tight in stud spaces in accordance with manufacturer's latest printed instructions and recommendations the full height of all exterior walls. Care shall be taken that insulation fits tight at top and bottom of stud spaces and that insulation is installed behind electric boxes and fitted in around windows and doors. Fold flaps on to stud edge, overlap and staple.
- B. Interior stud wall sound insulation shall be friction fit tight in all stud spaces in accordance with manufacturer's latest printed instructions. Insulation shall run full height of all party walls and at other locations as shown on the drawings. Full height of the wall is to include spaces above the ceiling line and between joists up to the underside of the floor above. Care shall be taken to run insulation behind electrical outlets and other objects in the wall so that sound may not pass "around" or "through" insulation via these objects. Insulate both sides of tenant separation walls and stair walls, and under stairs in garden units. When using 8'-0" batts in 9'-0" walls stagger the 1'-0" piece high and low in the 8" party walls.
- C. Floor separation sound insulation shall be installed Kraft face down and securely stapled to floor joists.
- D. Attic insulation shall be blown in uniform thickness and density in all areas and up tight to cardboard stops at eave as per the manufacturer's requirements to meet "R" value specified. Cardboard stops shall be varied to accommodate the required insulation thickness.
- E. Insulation stops shall be stapled to trusses as shown on the drawings and in accordance with the manufacturer's instructions. Stops shall be set so as to maximize space for insulation below stop.

3.02 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor.

END OF SECTION

SECTION 07 25 00

WEATHER BARRIER

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, and equipment needed to perform all weather barrier (house wrap) work as shown on the drawings and specified hereinafter. Provide membrane, seam tape, flashing and fasteners.

1.03 REFERENCES

- A. ASTM International
 - 1. ASTM C920; Standard Specification for Elastomeric Joint Sealants
 - 2. ASTM C1193; Standard Guide for Use of Joint Sealants
 - 3. ASTM D882; Test Method for Tensile Properties of Thin Plastic Sheeting
 - 4. ASTM D1117; Standard Guide for Evaluating Non-woven Fabrics
 - 5. ASTM E84; Test Method for Tensile Properties of Thin Plastic Sheeting
 - 6. ASTM E96; Test Method for Water Vapor Transmission of Materials
 - 7. ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls
 - 8. ASTM E2178; Test Method for Air Permeance of Building Materials
- B. AATCC – American Association of Textile Chemist and Colorist
 - 1. Test Method 127 Water Resistance: Hydrostatic Pressure Test
- C. TAPPI
 - 1. Test Method T-140; Grams of Paper and Paperboard (Weight per Unit Area)
 - 2. Test Method T-460; Air Resistance (Gurley Hill Method)

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer current technical literature for each component.
- B. Samples: Weather Barrier membrane, minimum 8 ½ inches by 11 inch.
- C. Quality Assurance Submittals
 - 1. Manufacturer Instruction: Provide manufacturer's written installation instructions.

1.05 QUALITY ASSURANCE

A. Qualifications

1. Installer shall have experience with installation of similar weather barrier assemblies under similar conditions.
2. Installation shall be in accordance with manufacturer's installation guidelines and recommendations.
3. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.

1.06 DELIVERY, STORAGE AND HANDLING

A. Refer to Section (01 60 00 Product Requirements)

B. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Store weather barrier materials as recommended by system manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. DuPont; 4417 Lancaster Pike, Chestnut Run 728, Wilmington, DE 19805; 1-800-44-TYVEK (8-9835).

2.02 MATERIALS

- A. Basis of Design; spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont®HomeWrap® and related assembly components.

B. Performance Characteristics:

1. Air Penetration: <.004 cfm/ft² at 1.57 psf, when tested in accordance with ASTM E2178. Type I per ASTM E1677.
2. Water Vapor Transmission: 56 perms, when tested in accordance with ASTM E96-05, Method A.
3. Water Penetration Resistance: 250 cm when tested in accordance with AATCC Test Method 127.
4. Basis Weight: 1.8 oz/yd², when tested in accordance TAPPI Test Method T-410.
5. Air Resistance: 1200 seconds, when tested in accordance with TAPPI Test Method T-460.
6. Tensile Strength: 30/30 lbs/in., when tested in accordance with ASTM D882.
7. Tear resistance: 8/6 lbs, when tested in accordance with ASTM D1117.
8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 15, Smoke Detector Developed: 15.

2.03 ACCESSORIES

- A. Seam Tape [2] [or] [3] inch wide, DuPont™ Tyvek® Tape as distributed by DuPont Building Innovations.
- B. Fasteners:
 - 1. DuPont Tyvek wrap caps as distributed by DuPont. #4 nails with 1 inch plastic cap staples with leg length sufficient to achieve a minimum penetration into the wood stud.
- C. Sealants
 - 1. Provide DuPont residential sealant or a sealant that complies with ASTM XC920, elastomeric polymer sealant to maintain watertight conditions.
- D. Adhesive
 - 1. Products
 - a. Liquid nails LN-109
 - b. Denso butyl liquid
 - c. 3M high strength 90
- E. Primer
 - 1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
- F. Flashing
 - 1. DuPont FlexWrap, as distributed by DuPont: flexible membrane flashing materials for window openings and penetrations.
 - 2. DuPont straight flash VF, as distributed by DuPont: dual-sided, straight flashing membrane materials for brickmold and non-flanged windows and doors.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.02 INSTALLATION – WEATHER BARRIER

- A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.
- B. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
- C. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface. Maintain weather barrier plumb and level.

- D. Extend bottom roll edge over sill plate interface 2" to 3" minimum. Seal weather barrier with sealant or tape. Shingle weather barrier over back edge of thru-wall flashings and seal weather barrier with sealant or tape. Ensure weeps are not blocked.
- E. Subsequent layers shall overlap lower layers a minimum of 6 inches horizontally in a shingling manner.
- F. Windows and Door Openings: Extend weather barrier completely over openings.
- G. Weather barrier Attachment:
 - 1. Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 12-18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.
- H. Apply 4 inch by 7-inch piece of DuPont™ StraighFlash™ or weather barrier manufacturer approved alternate to weather barrier membrane prior to the installation cladding an anchor.

3.03 SEAMING

- A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
- B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.04 OPENING PREPARATION (for use with flanged windows)

- A. Cut weather barrier in an "I-cut" pattern. A modified I-cut is also acceptable.
 - 1. Cut weather barrier horizontally along the bottom and top of the window opening.
 - 2. From top center of the window opening, cut weather barrier vertically down to the sill.
 - 3. Fold side and bottom weather barrier flaps into window opening and fasten.
- B. Cut a head flap at 45-degree angle in the weather barrier membrane at window head to expose 8 inches of sheathing. Temporarily secure weather barrier membrane flap from sheathing with tape.

3.05 FLASHING

- A. Cut [9 inch] wide DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF a minimum of 12 inches longer than width of sill rough opening. Apply primer as recommended by the manufacturer.
- B. Cover horizontal sill by aligning DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF edge with inside edge of sill. Adhere to rough opening across sill and jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

- C. Fan DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanical fastening is not required for DuPont™ FlexWrap™ NF.
- D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant cross sill.
- E. Install window according to manufacturer's instructions.
- F. Apply 4-inch wide strips of DuPont™ StraightFlash™ at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.
- G. Apply 4-inch wide strip of DuPont™ StraightFlash™ as head flashing overlapping the mount flange. Head flashing should extend beyond outside edges of both jamb flashings.
- H. Position weather barrier hard flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over 45-degree seams.
- I. Tape head flap in accordance with manufacturer recommendations.
- J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C1193.

3.06 PROTECTION

- A. Protect installed weather barrier from damage.

END OF SECTION

SECTION 07 31 13

ROOF SHINGLES AND SHEET METAL

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for the completion of all roof shingles and sheet metal work shown on the drawings and hereinafter specified.

1.03 RELATED SECTIONS

- A. Mason's flashing. (Section 04 20 00).
- B. Exterior siding flashing. (Section 07 46 23).
- C. Gutters and downspouts. (Section 07 71 23).
- D. Mechanical vent flashing. (Division 22).

1.04 GUARANTEE

- A. Upon completion, the Roofing Contractor shall furnish the Owner with a two (2) year written guarantee covering materials and workmanship of roofing and metal flashing and other sheet metal work. Leaks and damaged caused by leaks shall be promptly repaired and corrected by the roofing contractor at no cost to the Owner.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be delivered in manufacturer's unopened labeled bundles or containers.
- B. Store materials in a dry location and in a manner to avoid damage. Keep materials dry. Do not stack bundles of shingles more than 4' high. Store rolled goods on end.
- C. Do not permit stacking of materials which would overload the structure or traffic which would cause damage to roofing in place or to roof decks.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Shingles shall be GAF Timberline with equals by Owens Corning or approved equal. Shingles shall weigh approximately 245 pounds/square with a 30 year guarantee. Shingles shall be Class "A". Color by Architect.

- B. Underlayment shall be a single layer of 15 pound roofing felt.
- C. Underlayment in valleys and eaves, shall be W. R. Grace Ice & Water Dam or Winter Guard. Underlayment shall be self-adhered (peel and stick) type material.
- D. Nails shall be hot galvanized steel or aluminum sharp pointed conventional barbed shank roofing nails with minimum 3/8" diameter heads and of sufficient length to penetrate through plywood sheathing.
- E. All sheet metal flashing shall be .032 aluminum, manufacturer's prefinished color that is closest match to shingles as selected by Architect.
- F. Provide a metal drip cap strip at the eave edge continuously. Metal drip cap to be baked enamel. Color as selected by Architect. Drip cap shall be 2.3 inch X 1.5 inch drip by Amerimax or Berger. At cutter locations use aluminum gutter apron 2.0".
- G. Valley flashing shall be "W" valley, 24" wide, aluminum, manufacturer's prefinished color that is closest match to shingle, as selected by Architect.
- H. Roof mastic shall be as manufactured by the roofing manufacturer or as approved by the roofing manufacturer.
- I. Roof ridge vents shall be Cobra Snow Country shingle cap over unit. Unit provides 18 sq. in./ft.
- J. Surface mounted roof vents shall be Lomaco #135 or approved equal. (as shown on drawings) Vents shall be prefinished bronze to match shingles.
- K. Counter flashing shall be fabricated from prefinished aluminum coil stock. (Color to match.) All flashing shall have a "hemmed" edge with profiles as shown on the drawings.
- L. Step flashing shall be prefinished aluminum, 8" x 8" bent at a 90° angle with 4" out on shingles and 3" up the wall.

PART 3 EXECUTION

3.01 GENERAL

- A. It is the responsibility of the Roofing Contractor to examine the roof deck and to ascertain whether the roof deck is in satisfactory condition to receive the roofing and to notify the General Contractor in writing of any defects which may be detrimental to the proper installation of the roofing.

3.02 INSTALLING ROOF FELT

- A. Apply one layer of felt over sheathing, parallel to eaves, lapping each course over underlying course 2" minimum along edges and 4" at ends. Locate end laps of succeeding course at least 6' from end laps of preceding course. Any areas under 4/12 shall receive a double layer of felt. (If required by manufacturer's warranty requirement install a layer of waterproofing shingle underlayment at overhangs in lieu of 15 lb felt.

- B. Lap felt 6" from both sides and over ridges and hips.
- C. Secure underlayment to deck with sufficient fasteners to hold felt in place until shingles are applied.
- D. Install 36" wide Ice & Water Dam centered in valley. Smooth fabric and remove cover sheet. Make certain material has adhered to roof sheathing. Install lapped roofing felts over underlayment as listed above.

3.03 INSTALLING SHINGLES

- A. Install shingles to conform to recommendations of the shingle manufacturer and the ARMA Residential Asphalt Roofing Manual.
- B. Apply minimum 7" wide mineral surfaced roll roofing as a starter strip, or use strip shingles with tabs cut off as the starter strip. Starter strip and shingles shall overhang the drip cap at the eaves and rake by 3/8". Nail starter strip using same spacing as for shingles and locate nails 3" up from the bottom edge. Avoid nailing where cut-outs will occur on first course of shingles.
- C. Snap chalk lines to guide application and maintain level lines parallel with eaves. Also use chalk lines to maintain alignment of shingle cut-outs up the slope. Maintain uniform exposure of courses.
- D. Secure shingles only in location shown on shingle manufacturer's literature to insure that the nails are concealed. Wherever a nail fails to penetrate plywood decking, remove the fastener and secure in a new location. Secure shingles with the number of fasteners specified by the manufacturer.

3.04 HIPS, VALLEYS AND RIDGES

- A. "W" valley flashing shall be installed per roofing manufacturer's recommendations. In general the valley shall not be nailed to the roof and the shingles should not be nailed through the valley metal. The metal should be free to move with the expansion and contraction of the roof. The valley sections should be set in roofing mastic and the roofing shingles shall be set in roofing mastic to seal to the valley. After completion the edge of the roofing shingles should be sealed to the valley with roofing cement.
- B. Use shingles manufactured for the purpose or cut hip and ridge shingles from standard strip shingles. Do not use slit tabs. Bend each shingle equally over the ridge. If weather is cold, warm the shingles until flexible to prevent cracking.
 - 1. Start on end of ridge opposite prevailing wind. Expose shingles 5", and nail in concealed area using two nails each, 5-1/2" from the exposed butt end and 1" from the side edges.
 - 2. Start hips at bottom. Apply ridge after hips are installed. Finish with last ridge cap piece set in plastic cement. Do not leave nails exposed.

3.05 STEP FLASHINGS

- A. When the rake of roof abutts a vertical wall, apply metal flashing shingles over the end of each course of shingles as step flashing.
- B. Cut metal flashing pieces 8" x 8" and bend in half at a 90° angle (4" out and 3" up). Place each flashing shingle just up to the slope from exposed edge of shingle which overlaps it.
- C. Nail each flashing piece to the roof at the top edge with two roofing nails. Do not nail to vertical surface.
- D. Installed wall siding shall form the counter flashing for the metal base flashing. At brick locations provide prefinished counterflashing with reglet screwed into lead anchors in brick and caulk.

3.06 INSTALLATION OF SHEET METAL & COUNTERFLASHING

- A. Furnish and install all sheet metal in accordance with detailed requirements and as necessary to provide a water tight installation. Particular attention is directed to the projections through the roof, which shall be made tight by the sheet metal contractor.
- B. Caulk joints associated with roof flashing. Provide slip expansion joint filled with mastic and made water tight.
- C. All workmanship and details shall be in accordance with "Standard Practice" in Sheet Metal Work Manuals by the Sheet Metal Contractor's National Association, Inc.
- D. Metal drip cap shall be installed along with all eave edges prior to installation of roofing.
- E. Metal flashings around the roofing and other prominent areas visible from the ground which are not specified as prefinished shall be painted to match.
- F. Flashing at brick above porches, etc. shall be set in raked mortar joint or installed with a reglet screwed into mortar joints and caulked with minimum 40 year caulking.

3.07 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work, and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 07 46 16

FASCIA, SOFFITS & ACCESSORIES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for all aluminum and vinyl work as shown on the drawings and specified hereinafter. Some items of work are as follows:
 - 1. Aluminum soffit (solid and perforated as shown on the drawings).
 - 2. Aluminum fascia and trim.

1.03 RELATED SECTIONS

- A. Sheathing: (Section 06 16 00).
- B. Vinyl siding (Section 07 46 23).
- C. Gutters & downspouts (Section 07 71 23).

1.04 HANDLING AND DELIVERY

- A. All materials delivered to the job site shall be in unopened cartons and shall be protected from damage by all workers. Any damaged materials shall be replaced at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Aluminum fascia, trim, etc. shall be by Alside with equals by Mastic or Alcoa. Colors and style are to match existing buildings.
- B. Fascia shall be pre-manufactured unit with "ribs" to prevent oil canning. This subcontractor may, at his option, fabricate the fascia from coil stock, provided it is "ribbed" to prevent oil canning. This subcontractor shall submit a sample for approval prior to starting any work.
- C. Prefinished aluminum soffits shall be by Alside, perforated and solid as shown on the drawings. Provide accessories as shown on drawings.

- D. Provide all accessories as shown on the drawings and required for a complete job (i.e., "J" mold, frieze mold, etc.). Accessories shall be same manufacturer, color to match.
- E. Caulking shall be Secaflex urethane or approved equal. See Section. 07 92 00.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Soffits shall be installed where called for on drawings and according to manufacturer's instructions, using 1" frieze fascia runner, fascia cap and spiral shank aluminum nails. Solid and perforated soffit shall be installed in locations shown on the drawings. In general, all soffits for the main roof shall be "all" perforated. Soffits shall extend a minimum of one half way into the soffit accessory channel.
- B. Aluminum fascia and trim shall be installed as shown on drawings and in accordance with manufacturer's recommendations.
- C. All caulking of aluminum joints, connections, and where material abutts other materials, shall be in accordance with aluminum manufacturer's instructions and recommendations and shall be performed by the aluminum contractor. The caulking quality, performance and execution shall be equal to that specified in Section 07910 and the color shall match the aluminum trim color, as selected by the Architect.

3.02 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work, and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 07 46 23

VINYL SIDING, TRIM & SHUTTERS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for all vinyl siding, shutter and louver work as shown on the drawings and specified hereinafter.
- B. Caulk all areas where vinyl siding and trim abutt adjacent materials.

1.03 RELATED SECTIONS

- A. Aluminum fascia, soffit and accessories: Section 07 46 16.
- B. Gutters & downspouts: Section 07 71 23.

1.04 HANDLING AND DELIVERY

- A. All materials delivered to the job site shall be in unopened cartons and shall be protected from damage by all workers. Any damaged materials shall be replaced at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Vinyl siding shall be minimum .044 thickness, Charter Oak by Alside, with equals by Certainteed, Vipco, Provide starter strips, corner trim, window trim, "J" channel, etc. as required. Color as selected by Architect.
- B. Provide starter strips, corner pieces, "J" mold, drip cap, etc. as shown on the drawings and required for a complete installation. Color to match siding.
- C. 5" vinyl box trim, post trim, and window surround shall be as manufactured by Wolverine, Restoration Collection. Color to be "White".
- D. Light, outlet, A/C disconnect box, etc. shall be mounted on pre-manufactured "J" block units (color to match siding).
- E. Vinyl shutters shall be "Barkwood" paneled shutter by Mastic or approved equal. Units shall be 14" wide with height to match window units. Color by Architect. Anchor to building with color matched screw anchors. Plastic anchors are not acceptable.
- F. Caulking shall be polyurethane by Silkaflex or approved equal as listed in Section 07 92 00.

VINYL SIDING, TRIM & SHUTTERS

07 46 23-1

PART 3 EXECUTION

3.01 INSTALLATION

- A. Before beginning work, verify governing dimensions of building; examine, clean and repair, if necessary, any adjoining work on which this work is in any way dependent for its proper installation.
- B. The field application of the siding and trim members shall be in accordance with the best practice, with all joint members true and plumb.
- C. All work shall be in accordance with the manufacturer's latest printed instructions.
- D. Install where called for on drawings and details all siding and siding accessories such as flashing, starter strips, inside and outside corner posts, "L" channels, door and window trim, etc., as required for weather tight construction and good appearance.
- E. Siding shall be installed with manufacturer approved nails to stud back-up. Nails shall be drawn snug, but care shall be taken to allow for expansion of siding. Do not over tighten nails. All nails shall be through the center of pre-punched slots. Extreme care must be exercised to allow for thermal expansion in strict accordance with manufacturer's recommendations.
- F. Allow space between all siding and trim to allow for thermal expansion.
- G. Use back-up strip at all siding laps. Overlap minimum 1/2" and always place factory finished edge as top piece of lapped joints. Stagger all joints so that adjacent rows do not have aligning joints.
- H. Do not use pieces of siding less than 20" long except between openings which are less than 20" apart.
- I. Vinyl trim shall be installed as shown on drawings and in accordance with manufacturer's recommendations.
- J. All caulking of siding, joints, connections, and where siding abutts other materials, shall be in accordance with siding manufacturer's instructions and recommendations and shall be performed by the siding contractor. The caulking performance and execution shall be equal to that specified in Section 07 92 00 and the color shall match siding and trim.

3.02 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work, and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor.

END OF SECTION

SECTION 07 71 23

GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary to complete all gutter and downspout work. (Splashblocks shall be provided and installed by the General Contractor.)

1.03 RELATED SECTIONS

- A. Roofing and sheet metal: Section 07 31 13.
- B. Downspout boots and storm sewer: Division 33.
- C. Splashblocks are by the General Contractor.

1.04 GUARANTEE

- A. This contractor shall guarantee all gutter and downspout work against defects in material and workmanship for a period of one (1) year from the time of the project completion and shall repair or replace any defective work at no cost to the Owner during this period.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All gutters and downspouts shall be prefinished aluminum as manufactured by Alcoa, with equals by Mastic. Color shall be by Architect.
 - 1. Gutters .027"
 - 2. Downspouts 3 x 4 .024"
- B. Downspouts shall be manufacturer's standard with anchors to match. Anchors shall be strap type. All fittings (elbows, etc.) shall be manufacturer's standard.
- C. Gutters shall be the larger 4" x 6" size as shown on the drawings and shall be fabricated from prefinished metal using a continuous gutter machine. Hangers shall be spike and ferrule or screw anchor, color to match. Downspouts shall be 3" x 4".

PART 3 EXECUTION

3.01 INSTALLATION

- A. All gutters and downspouts shall be installed in accordance with details on the drawings, manufacturer's printed instructions and general good practice. Install an elbow at the bottom of each downspout. Elbow shall be 4" above finish grade to allow space for splashblocks.
- B. Gutters shall be installed sloping to the drains with no level spots. Adequate anchors (as per manufacturer's recommendations and general good practice) shall be installed on all gutters and downspouts to insure against wind damage. As a minimum, gutter hangers shall be installed at 2'-0" o.c.

3.02 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 07 92 00

CAULKING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, and equipment needed for doing all caulking as outlined herein. In general the building shall be completely sealed against water and air infiltration. Some items included are windows, doors, louvers, wall caps, etc.
- B. Without limiting the generality of the word "extent", some items of work are as follows:
 - 1. Interior plastic laminate tops and bath areas.
 - 2. Miscellaneous louvers, grilles, etc. openings in exterior wall materials not caulked by others.
 - 3. Door and window frames.
 - 4. Exterior siding and trim. (Includes all siding to brick, siding to trim, and siding to aluminum or vinyl caulking.)

1.03 RELATED SECTIONS

- A. Resilient flooring caulking: Division 9.
- B. Aluminum fascia and soffit caulking: Section 07 46 16. All aluminum to wood or aluminum to brick intersections shall be caulked by the Aluminum Contractor.
- C. Back and endsplashes shall be caulked to counter top by Finish Carpenter.
- D. Caulking at intersection between tub/shower and floor shall be by the Flooring Contractor.

1.04 QUALITY ASSURANCE

- A. All materials shall be first quality. Interior caulking compounds used in kitchen, wet areas, etc. shall conform to applicable code requirements for these locations.

1.05 SUBMITTALS

- A. Submit manufacturer's technical product data for sealants, including detailed recommendations for joint preparation, use of primers, and sealant application.
- B. Submit sample cartridges of each type of sealant material and samples of accessories and colors.

- C. Submit color charts for tentative color selection, showing manufacturer's complete range of standard colors for each specified type. Submit cured samples of sealants for final approval of color before beginning application.

1.06 WEATHER CONDITIONS AND SCHEDULE

- A. Do not proceed with installation of liquid sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation. Generally, apply sealants when ambient temperature is between 45 degrees F. and 90 degrees F.
- B. Coordinate time schedule of application with work of other trades to avoid delay of project.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Caulking compound for all exterior work shall be one part Poly Urethane as manufactured by Sicaflex or Vulken by Tremco.
- B. Interior caulking for miscellaneous areas to be painted shall be "acrylic latex" grade as manufactured by DAP.
- C. Caulking compound for baths in units, and all "wet" areas shall be G. E. Silicone Construction 1200 sealant, with approved equals by Dow Company.
- D. In kitchens all plastic laminate @ the backsplashes shall be set in caulk and allowed to setup. Once dry, the caulk shall be cut off at the plastic laminate intersections (top to backsplash) shall be caulked with clear silicone as listed for baths by the Finish Carpenter. Intersections of plastic laminate to drywall shall be caulked with acrylic latex as listed above by the Painter.
- E. Crown mold caulking shall be 1418 Top Gun 400 Acrylic Urethane Elastomeric sealant.
- F. Back up material shall be untarred oakum, fiberglass, polyurethane foam, or polyethylene foam rope. No oily or asphaltic materials may be used. The filler shall be uniform to provide the sealant depth required.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All caulking shall be applied in the best possible manner with all surfaces receiving caulking cleaned and prepared according to the compound manufacturer's recommendations. Apply suitable primer to masonry surfaces with brush prior to applying caulking.
- B. All caulking shall be done by gun method, with size of nozzle selected to suit conditions and a full bead provided throughout, with all joints made wind tight. At windows, caulk on inside as well as outside.
- C. At all openings, windows, and doors to the exterior, and to each unit, thoroughly caulk jams, sills and heads with full bodied caulking compound. Joints shall be filled completely and give a neat, smooth appearance.

- D. Where wood frames occur, and at large openings, caulk first with back up materials and then with caulking compound.
- E. Tooled joints shall be tooled to form a neat, concave surface and shall be done within ten (10) minutes of caulking application. Tooling shall be completed in one continuous stroke.
- F. Completely seal the building according to best practices to make water and weather tight.
- G. Pack joints in excess of 1/2" deep with back up material, within 1/2" of exposed surfaces.
- H. Caulk joints before final coat of paint is applied to adjacent work.
- I. Joints shall be solidly filled, run in true straight lines, free from lumps and irregular edges and finished clean, with smooth and neat surfaces. Do not permit compound to sag or lump up.
- J. Plastic laminate countertops shall have the intersection of the sidesplash and the top sealed with clear silicone. If a crack occurs between the backsplash and the wall this seam shall also be caulked with a good grade of white interior latex caulking.
- K. Caulk perimeter of tub and shower units.

3.02 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusual materials resulting from his work, and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 08 14 00

INTERIOR DOORS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary to furnish and install all interior door work as shown on the drawings and specified hereinafter.

1.03 RELATED SECTIONS

- A. Exterior doors: Section 08 16 13
- B. Finish hardware: Section 08 71 00
- C. Interior finish carpentry: Section 06 20 23

1.04 STORAGE AND HANDLING

- A. This contractor shall ship doors to prevent damage to doors. Doors shall be handled carefully to prevent scratching and damaging. All damaged doors shall be replaced by this contractor at his own expense.

1.05 QUALITY ASSURANCE

- A. Construction of wood doors shall meet or surpass applicable minimum requirements of the NWMA Industry Standard i.s.i.-80 or Architectural Woodwork Institute (AWI) Quality Standards, Section 1300, for the types of doors specified, and specification requirements.

1.06 WARRANTIES

- A. Furnish manufacturer's standard written warranties covering replacement of prehung wood doors provided according to warranty requirements, as follows:
 - 1. Interior hollow core, hardboard and flush wood doors: one year from date of installation.
- B. Warpage in excess of 1/4" in the plane of any door or which prevents latching or proper functioning of door shall be considered a defect under terms of the warranty. Delamination also shall be considered a defect.
- C. Furnish written warranties promptly upon completion of the door installation.

PART 2 PRODUCTS

2.01 INTERIOR DOORS

- A. All interior doors labeled as wood shall be solid or hollow core doors as listed in the door schedule. Doors shall be 4 panel door by Masonite. (Smooth finish.)
- B. Doors shall be as manufactured by one manufacturer and be by Michigan Birch, Morgan, Weyerhaeuser, or Young.
- C. All doors shall be prehung, size and hand as shown on the drawings. Frame and trim shall be prime painted.
- D. All doors shall be back beveled and shop bored or mortised as required for hardware and hinges to fit the hardware listed and the metal door frame hinge sizing and spacing. All shop work shall be in accordance with information received from the respective suppliers of these items.
- E. Doors shall be manufactured in accordance with HWMA-1S1, and shall bear a label or otherwise be suitably identified as to name of manufacturer and compliance with these standards.
- F. Sizes and hand of doors shall be as shown on drawings.
- G. Bi-fold door units shall be supplied complete with tracks, guide hardware, hangers, door stops and bumpers for a complete installation. Bi-fold doors shall have wood pulls (plastic not acceptable).

2.02 FABRICATION

- A. Interior wood doors shall be premachined to template for hardware and prefit to assembled frames.
- B. Interior doors shall be prehung to conform to NWWOA I.S.1.-87, with the following clearances:
 - 1. Jamb and door edge: 1/16" plus or minus 1/32".
 - 2. Face of door and edge of door stops: 1/16" plus or minus 1/32".
 - 3. Top of door and head: 1/8" plus or minus 1/32".
 - 4. Lock edge of door and jamb: 1/8" plus or minus 1/32".
 - 5. Bottom of door to be 3/4" above bottom of jambs to allow for carpet thickness.
- C. Each interior hollow core wood door shall be prehung with one and one half (1-1/2) pair of 3-1/2" X 3-1/2" hinges to afford a swing of 180°. Hinges to match finish listed on Hardware Schedule.
- D. Frames shall be factory or shop assembled.
- E. Each door frame shall be temporarily secured across the bottom to insure safe handling until delivery to construction site.

- F. Interior doors and frames shall be shipped to prevent damage during loading and unloading.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install wood doors plumb, square and true, without warpage, according to the manufacturer's directions. Shim at top and bottom of jambs and center of head. Shim at all hinges and strike plate. Nail jambs and trim with 6d nails countersunk. Jambs shall be plumb with level head and adjusted for proper operation and to prevent binding.
- B. Bi-fold and bi-pass doors shall be installed in drywall openings. Any openings out of plumb, level or square beyond acceptable standards shall be corrected by the drywall contractor prior to door installation. Install top track and bottom mounting brackets per manufacturer's instructions. Install door and adjust for plumb and smooth operation. Install trim strips as shown and recheck door operation.
- C. After installation check for uniform clearances at head, jambs, and floor, and trim the doors if necessary to provide free operation. Provide additional undercutting of doors if necessary to clear the finish flooring, including thresholds and carpet, but never more than maximum permitted by manufacturer.

3.02 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor.

END OF SECTION

SECTION 08 16 13

CLAD AND FIBERGLASS DOORS AND FRAMES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for the completion of all clad door work as shown on the drawings and specified hereinafter.

1.03 RELATED SECTIONS

- A. Hardware: Section 08 71 00
- B. Painting of doors and frames: Division 9

1.04 STORAGE AND HANDLING

- A. Doors and frames shall be received by the contractor at the job site and handled in a manner so as not to be damaged. They shall be stored upright in a protected area on wood runners or skids and shall be covered with vented tarpaulins or vented plastic.
- B. Materials which are damaged due to any cause shall be rejected for use and replaced with new materials at no cost to the Owner.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Plastpro, with equals by Therma-Tru, Jeld-Wen. Insulated metal clad shall be considered an approved equal.

2.02 DOORS

- A. Entry and interior doors listed as metal clad shall be pre-hung fiberglass 4 panel as manufactured by Plast-Pro or approved equal.
- B. Exterior frames shall be rabbitted "treated" wood with kerf to receive weatherstripping. Material shall be treated for rot and decay and shall be shipped with a factory installed brick mold.
- C. Threshold shall be two-piece with thermal break. Provide low profile threshold meeting ADA.

- D. Construction:
1. Door skins: high impact compression molded fiberglass reinforced material.
 2. Top and bottom rails: composite material. Bottom rail accommodates a range of door sweeps.
 3. Stiles: composite material, full length of door.
 4. Extended lockblock: accommodates a minimum of 20" of lockblock.
 5. Core: 110% CFC-free polyurethane insulation.
 6. Hydroshield Technology™; water-resistant construction protects doors against water infiltration on all six (6) sides to prevent warping, delamination, corrosion, rotting, and buildup of mold and mildew.
 7. 8'-0" Doors or taller: provide with a metal beam on the lock side of the door.
- E. Acoustical Performance:
1. Provide doors with a Sound Transmission Class (STC) rating calculated in accordance with ASTM E413 where indicated on drawings as follows:
 - a. Flush opaque doors: 22
 - b. Full lite doors with one (1) inch glass: 29
 2. Provide doors with a Sound Transmission Class (STC) rating calculated in accordance with ASTM E1332 where indicated on drawings as follows:
 - a. Flush opaque doors: 23
 - b. Full lite doors with one (1) inch glass: 30
- F. Fabrication: Units fabricated rigid, neat in appearance, and free from defects, warp or buckle. Exposed welds are to be made smooth, flush and invisible.
- G. Full glazed doors shall be tempered insulated glass with snap-in removable 15 light shop prime grilles, see elevations for locations.
- H. Wood Frame Materials: Kiln dried Ponderosa Pine. Width: 4-11/16".
- I. Wood Frame Preparation: Form kerf in jamb to receive magnetic lock and head jamb weatherstrip and compression hinge jamb weatherstrip. Weatherstrip to be furnished installed.
- J. Threshold shall be two piece thermal break.
- K. Fixed units to have two piece thermal break threshold with sill gasket for door unit set in sealant.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Doors and frames shall be installed true and plumb per manufacturer's recommendations and industry standards for general good workmanship. "Labeled" doors and frames shall be installed per UL label requirements.
- B. Door shall be pre-hung in frame. Unit shall be set in place, plumbed and tacked in place temporarily to hold. Check jambs and head for plumb and level. Shim hinge jamb at all hinges as a minimum. Install extra long screws into top hinge extending into framing. Shim strike jamb as required and provide a solid shim at strike box. Doors with brick mold shall have trim face nailed. All fasteners shall be galvanized finish nails.
- C. Install doors in compliance with manufacturer's written instructions.

3.02 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor.

END OF SECTION

SECTION 08 53 13

SINGLE HUNG WINDOWS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All materials, equipment and services necessary for supplying all single hung windows as shown on the drawings and specified hereinafter (Installation by carpenter)

1.03 RELATED SECTIONS

- A. Caulking: Section 07 92 00
- B. Exterior Finish Carpentry: Section 06 20 13

PART 2 PRODUCTS

2.01 GENERAL

- A. All single hung windows shall be welded vinyl windows, Series V2500 as manufactured by Jeld-Wen with equals by Capitol or Vinylmax. (Please note some windows call for higher STC rated glass) Size and types shall be as shown on the drawings. Windows shall bear an applied label certifying compliance with standards outlined herein. Windows shall be Energy Star rated.
- B. Windows shall meet or exceed AAMA requirements and shall carry an AAMA Certification Label.

2.02 CONSTRUCTION

- A. Main Frame and Sash - Shall be made from rigid polyvinylchloride (PVC) multi-hollow extrusions which have a minimum wall thickness of .050". Main frame shall be welded together at the corners. Overall frame depth is 3-1/4".
- B. Moveable Sash - Shall be made from rigid polyvinylchloride (PVC) extrusions which have a minimum wall thickness of .062". Sash to be of welded corner construction. Sash to have metal reinforcement in horizontal members.
- C. Fixed Meeting Rail - shall be made from a rigid PVC hollow extrusion with a .050" wall thickness. Meeting rail shall be secured to the main frame with two screw fasteners through injection molded end caps attached to the meeting rail with two screws. Bottom of main frame to have foam bulb to seal against the moveable sash.

- D. Sill Insert - Shall be made from rigid PVC with a wall thickness of .060". It shall "snap fit" into the main frame sill. Sill insert to be sealed with double sided foam tape before insertion. Inside joint between sill snap-in and main frame to be sealed.
- E. Glazing - Top or fixed, glass panel shall consist of 7/8" thick insulated glass. Fixed (top) glass to be held securely in place by the use of a single sided adhesive foam tape at the exterior and a rigid PVC glazing bead, which has a minimum wall thickness of .070" at the interior. Low-E glass, argon gas, and other glazing options available. Moveable sash glass panel shall consist of 7/8" thick insulated glass. Glass to be held securely in place by double sided adhesive foam tape with rigid, extruded, vinyl interior glazing bead. Glass shall be offset glass 3/16" & 1/8" with duralite spacer to provide an STC of 32.
- F. Weatherstripping - Moveable sash shall have double strips of center fin weatherstripping on each stile and on the top rail. Sill insert shall have one strip of center fin weatherstripping. Bottom of moveable sash to contain one foam filled bulb.
- G. Hardware - Moveable sash balance mechanism to consist of stainless steel constant force springs. Two metal cam type sweep locks to be located equidistant from each end of the top sash rail. Two sweep lock keepers to be fastened to the fixed meeting rail. One plastic tilt latch shall be used at each end of the sash top rail. All screws, clips, and other fasteners shall be made of non-corrosive materials compatible with aluminum.
- H. Screen - Half screen only. Screen to be made from roll-formed aluminum, 5/16" X 3/4" with a .020" wall thickness. Screen cloth to be made from 18X16 fiberglass mesh and held securely by flexible, vinyl spline. Screens shall meet ANSI/SMA Standard 1004-87. (Note: Insect screens are intended only to provide reasonable insect control. They are not intended to prevent people or objects from exiting the window or to provide security against forced entry.)

PART 3 EXECUTION

3.01 PROTECTION AND CLEANING

- A. Protect all materials until received and accepted at job site by General Contractor. Glass which is broken, cracked, chipped, or otherwise damaged due to any cause prior to acceptance of windows shall be replaced by this subcontractor without cost to the General Contractor.
- B. This contractor shall not be responsible for any broken glass after he has turned over the windows to the General Contractor. However, he shall quote in his proposal for the cost of replacing any glass broken during construction.

3.02 INSTALLATION

- A. All window frames shall be set in wall construction in accordance with the manufacturer's instructions without forcing or distorting. Frame jambs shall be aligned parallel and installed square with frame heads and sills. Frame shall be adequately supported its entire length without bowing and twisting. A nonhardening caulk sealant, DAP latex with silicone or approved equal, compatible with vinyl and construction materials, shall be provided by the window installer and applied in sufficient quantity to provide a water tight joint between the nailing fin frame and surrounding construction. Contractor may use sealant tape over fin of window in lieu of caulking if approved by Architect. Once window is plumb and square "tack" nail fin with galvanized roofing nails.

- B. Check window operation and adjust as required. Finish nailing fin insuring that fin is pulled tight into caulking. Clean excess caulking.

3.03 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and material, and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 08 71 00

FINISH HARDWARE

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. It is the intent of this Specification to include the complete finish hardware requirements for the building project. Any units not specifically mentioned herein must be furnished and should conform to units to which it is applied.
- B. Hardware to be delivered to the jobsite complete for installation by Carpenter

1.03 RELATED SECTIONS

- A. Cabinet hardware: Division 12
- B. Interior Finish Hardware: Section 06 20 23

1.04 DETAILS

- A. The hardware supplier shall consult the project drawings and details and otherwise familiarize himself with work to the end that all items of a hardware furnished shall conform to units to which it is applied.
- B. He shall coordinate the hardware with other trades such as millwork, metal doors, and frames.

1.05 SAMPLES

- A. The hardware supplier shall prepare and submit to the Architect, for approval, shop drawings and samples of the exact hardware to be furnished. If items other than those listed herein are used in bidding, a list of the items specified and any proposed substitution must be submitted with the bid.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. All locksets shall be Schlage Lock Company or approved equal. Finish for all hardware shall be lever handle brushed nickel.
- B. Acceptable manufacturers listed below (Contractor may submit other manufacturers for review as an approved equal):

Butts	Soss, Hager, Stanley
Locksets	Schlage, Master Lock
Closers	Dorma, L.C.N. 461, Sargent 1231
Trim	Quality, Rockwood, Baldwin
Exit Devices	Von Duprin, Sargent 80
Misc.	As detailed.

- C. Hardware shall comply with ANSI A156.2 and the applicable series of the specification.

PART 3 EXECUTION

3.01 SCHEDULE

- A. This schedule is provided as a guide to the general type and function of hardware required and is not necessarily complete as to quantities. If equal hardware is to be used, contractor shall submit equal for approval. All locks shall be keyed separately and master keyed with four (4) keys.

3.02 INSTALLATION

- A. All finish hardware shall be accurately fit and securely applied in accordance with manufacturer's printed instruction and templates. Doors shall be hung accurately so as to allow door to stand open in any position. Prior to final inspection, examine all wood doors and other parts and adjust as required to leave in perfect working order.
- B. All hardware shall be installed using manufacturer templates and fasteners. Review any items of question with the Architect in the field prior to starting installation.

3.03 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and material, and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 09 29 00

DRYWALL

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary to perform all drywall work as shown on the drawings and specified hereinafter.

1.03 RELATED SECTIONS

- A. Wood Framing: Section 06 11 00

1.04 STORAGE AND PROTECTION

- A. Upon delivery to the site all materials shall be carefully stacked, neatly piled, and properly protected from the weather and other damage.
- B. Materials which are damaged due to any cause shall be rejected for use and replaced with new materials at no cost to the Owner.
- C. Care shall be taken that stacked drywall does not exceed the load limit of the floor joists. (Consult manufacturer for recommendations.) Any structural damage caused by overloading of drywall shall be the responsibility of this subcontractor. Stock drywall perpendicular to framing and adjacent to bearing points.

1.05 QUALITY ASSURANCE

- A. Install gypsum board in accordance with applicable requirements and recommendations of Gypsum Association GA216 "Recommended Specifications for the Application and Finishing of Gypsum Board" except for the more stringent requirements of the manufacturer or these specifications.
- B. Where shown as fire rated construction, the materials and installation shall conform to requirements of Underwriters Laboratories, Inc. tests for wall and ceiling assemblies and conditions and to the local building code.

1.06 JOB CONDITIONS

- A. In cold weather when outdoor temperature is below 55 degrees F. heat shall be maintained in the building at minimum 55 degrees F. until gypsum board installation and joint treatment have been completed. Do not start the installation until windows are glazed

and exterior doors installed unless openings are temporarily closed. Provide natural or power ventilation to remove excess moisture during joint treatment. Temporary heaters to be provided by General Contractor. Drywall Contractor shall move heaters as required and be responsible to maintain heat in areas where work is being performed.

- B. Store adhesives approximately 70 degrees F. for 24 hours prior to application. Provide ventilation and take precautions for flammable material. When necessary remove excess applied adhesive with petroleum solvent such as naphtha.

PART 2 PRODUCTS

2.01 GENERAL

- A. The products and materials hereinafter designated shall be as manufactured by United States Gypsum and Gold Bond and shall be of the type, length, and size as specified unless otherwise indicated. Approved equals by National, Flintkote, and Georgia Pacific.

2.02 DRYWALL

- A. Drywall for all areas shall be 5/8" firecode drywall, ASTM C36-80, Type X, tapered or eased edges, 48" wide by optimum length to provide required rating. Use 4'-6" wide board for 9'-0" high ceilings.
- B. Moisture resistant drywall shall be installed near any water source as shown. Drywall shall be Gold Bond & Moisture Resistant Gold Bond XP Fire-Shield Gypsum Board.

2.03 METAL FURRING AND FRAMING

- A. Resilient channel furring: Galvanized steel, 2 3/4" wide X 1/2" deep, with pre-punched holes 4" o.c. in the nailing flange; weight 220 pounds/MLF; U. S. Gypsum Co. RC-1 resilient channel or approved equal.

2.04 TRIM

- A. Standard metal trim: Zinc coated steel, 26 gauge (.018") minimum, Federal Specification QQ-S-774, Type 1, Class "d" or "e".
 - 1. Casing beads: Channel shaped with minimum 7/8" perforated or expanded flange; U. S. Gypsum 200A or 810A, or approved equal. (Not to be used at aluminum windows.)
 - 2. Corner beads: Expanded wings; 1/8" nose; U. S. Gypsum #800 or approved equal.
- B. Plastic trim: Rigid PVC, exterior grade, ASTM D1784.
 - 1. Casing Bead: Model 220-50/200-58 "J" bead by Plastic Components, Inc., 7570 NW 79th St., Miami FL 33166. Use at all windows and sliding doors.
 - 2. Vaulted Ceiling Trim: Flexible vinyl trim by Trim-Tex Inc. or approved equal. Submit sample to Architect.

2.05 ADHESIVES AND JOINT TREATMENT MATERIALS

- A. Fastening adhesive for wood: ASTM C557-03 (2009)el.
- B. Joint compounds: ASTM C475/C475-M-02 (2007); ready mixed prefill, taping and topping compounds, regular.
- C. Reinforcing joint tape: C475/C475-M-02 (2007); perforated cross fibered paper, feathered edges, 2" nominal width.

2.06 FASTENERS AND ACCESSORIES

- A. All drywall shall be installed with screws. Screws: ASTM C1002-07; self drilling, self taping, bugle head type, for use with special power driven tools; rust inhibitive.
 - 1. Wood screws: A minimum 1-1/4" long for single layer application.
 - 2. Screws into metal furring: 1" minimum for single layer application; type S, 1/64 in diameter; rust inhibitive.

2.07 TEXTURING

- A. Ceilings (listed as textured) shall be textured with topping compound by U. S. Gypsum or approved equal. Finish to be "knock-down".

PART 3 EXECUTION

3.01 GENERAL

- A. Examine framing and blocking and weather protection for defects which would adversely affect the gypsum board installation.
- B. Verify that all insulation has been placed in an acceptable manner and that inspection of framing, electrical, HVAC, and plumbing rough-in work has been completed before beginning the installation in each unit.
- C. Do not install wallboard until unsatisfactory conditions have been corrected.
- D. Do not finish drywall until adequate temperature has been provided by the General Contractor.

3.02 INSTALLATION

- A. All firecode drywall shall be so installed in accordance with the system used for the approved applicable fire rating tests obtained by the drywall manufacturer and accepted by the state and all other governing agencies. Installation of fire rated drywall will not be accepted unless installed in accordance with tested assembly instructions.
- B. Installation and application of materials shall be in accordance with referenced standards, the manufacturer's recommendations, and these specifications. In case of conflict, the more restrictive requirement shall apply.
- C. Loosely butt wallboard joints together and neatly fit. Do not place butt ends against a

tapered edge. Maximum allowable gap at end joints shall be 1/4".

- D. Locate abutting end joints when board is applied at right angles to studs, metal channels, or furring; or when applied parallel to studs or furring over the web surface of the support.
- E. Apply wallboard to ceiling first (where both gypsum board ceilings and walls occur) and then to the walls.
- F. Install board in maximum practicable lengths to span surfaces with a minimum of end butt joints. Where butt joints occur, stagger the vertical joints between courses and locate joints as far as possible from center of walls. Place end joints on opposite side of a partition on different studs.
- G. Make joint layout at openings so that no end joint will align with edges of the opening.
- H. In 9'-0" high ceiling areas if board is run horizontally use 4'-6" wide board with one seam in the middle.
- I. Cut openings in wallboard to fit electrical outlets, plumbing, and piping and small enough to be covered by plates and escutcheons. Cut both face and back paper for all cut outs which are not made by use of a saw. Do not use hammer to break openings.
- J. Mix adhesive, joint finishing compounds and texturing compounds in strict accordance with manufacturer's directions. Mix only enough at one time to be used during the recommended pot life of compound.

3.03 FASTENERS

- A. General requirements:
 - 1. Install fasteners no closer than 3/8" to ends or edges of boards.
 - 2. Begin fastening from center of wallboard and proceed toward outer end of edges, with fasteners to occur near edges at all supports.
 - 3. Apply pressure on wallboard adjacent to fasteners being driven to insure the wallboard will be secured tightly to framing member. Check for looseness at fasteners.
 - 4. Drive fastener with shank reasonably perpendicular to face of board.
- B. Nailing: (Only to hold board in place - then use screws.)
 - 1. Position nails on adjacent ends or edges opposite each other.
 - 2. Use a hammer recommended for this purpose.
 - 3. With last blow of hammer seat nail so head is in slight uniform dimple formed by last blow of hammer. Do not break face paper and do not use a nail set.
 - 4. Drive nails so heads are opposite each other on adjacent edges and ends.
- C. Screws application:

1. Drive screws with a power screw driver as recommended by wallboard manufacturer.
2. Surface of head shall be slightly depressed below surface of paper without cutting paper, not more than 1/32" deep.
3. Space screws for each application as specified herein.
4. Use screws for installation of gypsum wallboard applied over resilient furring channels.
5. Stagger screws on adjoining edges and ends.

3.04 CEILING SYSTEM

A. Single layer ceilings - direct attachment:

1. Attach gypsum board with long dimension at right angles to supporting joists. Secure with nails or screws at each framing intersection, 16" o.c. at each panel end, and one fastener per framing member at panel midpoint.
2. Locate abutting end joints over surface of joists or blocking. Stagger the end joints between panels.

B. Resilient Channels:

1. In locations, as shown on the drawings, provide resilient channels. Channels shall be 16" o.c. when framing is at 24" o.c. and 24" o.c. when framing is at 16" o.c. Channels shall be screw attached to framing thru prepunched slots. Drywall shall be screw attached to channels with care taken to miss intersection where channels cross framing.
2. Installation shall be per manufacturer's strict recommendations and requirements.

3.05 WALLS

A. Boards over wood studs:

1. Apply boards on walls horizontally, for single layer application, unless otherwise approved, with face exposed. Locate abutting ends over the stud flanges and stagger the end joints between courses.
2. Stagger the end joints on opposite sides of partitions.
3. Do not locate a vertical joint within 8" of external corners or of windows, doors, or other such openings.
4. In areas with 9'-0" ceiling height where board is installed horizontally, use 4'-6" wide board.

3.06 INSTALLING ACCESSORIES

A. Metal (or plastic) trim:

1. Provide standard galvanized steel trim or plastic trim for typical trim conditions as listed previously.
 2. Furnish trim in continuous lengths without joints unless corner or edges exceeds standard stock lengths.
 3. Provide corner beads for all external angles, vertical and horizontal.
 4. Attach trim over face of wallboard with suitable fasteners spaced 9" o.c. maximum and at ends of trim.
 5. Use edge trim at internal corners where exposed wallboard meets finish wall surfaces of other materials, and as required by conditions to allow for expansion and contraction.
 6. Install neatly and securely and according to manufacturer's instructions.
- B. Corner beads:
1. Erect to a straight, true line; plumb the vertical joints and level the horizontal joints.
 2. Fasten to wallboard 9" o.c. maximum on both sides with suitable fasteners.
 3. All metal corner beads shall be fastened securely by the subcontractor; crimping of bead is not acceptable.
- C. Casing beads:
1. Install casing beads on cut edges of wallboard abutting exterior metal door frames and metal windows, except omit where edge of board is concealed behind frame or trim.
 2. Install casing bead or edge in all other locations where the edge or end of wallboard is to remain exposed.

3.07 JOINT TREATMENT FOR INTERIORS

- A. Prefilling:
1. Fill flush with prefill compound all "V" grooves formed by abutting eased edges of wallboard.
 2. Wipe clean the excess compound beyond groove, leaving a flat joint for taping.
- B. Taping:
1. Apply a thin, uniform layer of taping compound to all joints and angles to be reinforced.
 2. Apply reinforcing tape immediately, centered over joint, and well sealed into compound.
 3. Follow immediately with a skim coat which is not to function as a fill or second coat.

4. Fold tape and embed in angles to form clean, neat corners, except where control joints are necessary. Apply tape in corners between abutting walls of gypsum wallboard and between abutting walls and ceilings of gypsum wallboard.

C. Filling:

1. After taping compound has hardened, apply topping compound, filling the board taper flush with surface.
2. Cover the tape and feather out slightly beyond taper.
3. On joints without taper, cover tape with full coat and feather out at least 4" on both sides of tape. No fill coat is necessary on interior angles.
4. Also fill the joints of gypsum wallboard in portions of fire rated partitions extending above ceilings. Sanding is not required in permanently concealed locations.

D. Finishing gypsum wallboard:

1. After the initial application of topping compound has dried, evenly spread a finish coat of topping compound over and extending slightly beyond fill coat on all joints and feather to a smooth uniform finish.
2. Over tapered edges the finish joint shall not protrude beyond the plane of surface.
3. Give all taped angles a finish coat to cover tape and taping compound and provide a true angle.
4. Where necessary, sand between coats and after final application of compound in order to provide a smooth surface, ready for decoration.
5. At fasteners apply two coats of topping compound, leaving all depressions level with plane of surface.
6. At finishing beads and trim apply taping compound and feather out approximately 8" from ground to plane of surface. When hard, follow with two coats of topping compound applied separately and allow to dry between coats. Extend each slightly beyond previous coat. Feather and sand as necessary. Avoid roughing surface of wallboard.
7. Leave wallboard areas smooth and uniform ready for painting.
8. On ceiling wallboard surfaces to be textured apply texture topping compound after joints have been filled and taped.

3.08 CEILING TEXTURING

- A. Prior to commencing work, this Subcontractor shall review the texturing with the Architect and Owner. Several test panels shall be prepared with varying textures. The Architect and Owner shall select and approve the texture desired and from thence forward all project texturing shall match the approved sample or be corrected by this Subcontractor at

no additional cost.

- B. Areas to be textured shall receive one coat of topping compound applied with a roller or spray applied. Texturing shall then be "stomped" with a window cleaning brush and allowed to partially set up. After finish is partially set, the finish shall be lightly skip troweled to provide a "knock-down" appearance. Provide sample for approval prior to starting work.

3.09 PATCHING AND CLEANING

- A. After trim has been applied, and prior to decoration, correct the surface damage and defects to leave work smooth and uniform and without observable blemishes which will show through decoration.
- B. Upon the completion of the work, clean tape and cement from floors and trim, remove from the building pieces of gypsum board and other rubbish resulting from gypsum board application and leave the floors broom clean.
- C. Remove promptly from the job site all excess materials, scaffolding, tools and other equipment.

3.10 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property and leave all floors broom clean in areas affected by his work. Drywall Contractor may not dispose of scraps in the General Contractor's dumpster. He shall remove all scraps and debris from the site completely.

END OF SECTION

SECTION 09 65 16

SHEET VINYL, PLANK FLOORING, VCT AND VINYL BASE

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.01 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for the installation of all resilient sheet flooring and vinyl base as shown on the drawings, listed in the finish schedule, and specified herein.

1.03 RELATED SECTIONS

- A. Carpet: Section 09 68 00

1.04 QUALITY ASSURANCE

- A. Colors of resilient materials shall match approved samples.
- B. Employ only workmen skilled in laying resilient flooring.
- C. Install materials according to manufacturer's printed instructions.
- D. Use only primers and adhesives recommended by the resilient material manufacturers. Where manufacturers list more than one acceptable adhesive, use the manufacturer's preferred material. Ensure that primers and adhesives are compatible with the subfloor or concrete fill.

1.05 DELIVERY, STORAGE AND JOB CONDITIONS

- A. Deliver materials to job in manufacturer's original unopened containers, bearing manufacturer's label.
- B. Do not permit materials to freeze. Maintain resilient flooring materials and spaces to receive such materials at a minimum temperature of 65 degrees F. beginning at least 24 hours before installation and continuing until at least 48 hours after completion. Maintain completed spaces above 55 degrees F. thereafter.
- C. Provide ventilation to remove fumes from solvent base adhesives.
- D. Do not start work in each space until work of other trades, including painting, has been substantially completed. Moisture content of underlayment, building air temperature and relative humidity must be within limits recommended by flooring manufacturer.

PART 2 PRODUCTS

2.01 FLOORING (As Listed in Finish Schedule)

- A. Plank flooring where shown on the drawings shall be Shaw Harwich "Honey" Vinyl Plank Flooring.
- B. Bathroom sheet vinyl for all unit types is to be Armstrong Strata Max #X2560.

2.02 VINYL BASE (See Room Finish Schedule)

- A. Flooring accessories shown on the Finish Schedule shall be Armstrong Vinyl Cove Base with equals by Flexco or Roppe. It shall be constructed of first quality raw materials properly vulcanized and shall be smooth and free from imperfections which detract from its appearance. The base shall conform fully to the requirements of ASTM F-1861.
- B. Vinyl base (as called for in Finish Schedule) for areas receiving resilient flooring shall be 4" x 1/8" "toed". Color to be Parchment #73.

2.03 UNDERLAYMENT, PRIMERS AND ADHESIVES

- A. Primers and adhesives: Water proof, stabilized types, specifically recommended by the manufacturer of resilient material for each material, location and condition, and free of lingering objectionable odors. Do not use asphalt emulsions and other non-waterproof types.
- B. Crack Filler: Type recommended by floor manufacturer for type of substrate; Armstrong S-180, Kentile "Fast Kenpatch" No 19, or approved equal.
- C. Use manufacturer approved mastic suitable for use over plywood underlayment, lightweight concrete floor fill and concrete.
- D. Mastic underlayment for concrete floors: Type recommended by floor covering manufacturer, suitable for purpose and compatible with adhesives.

PART 3 EXECUTION

3.01 INSPECTION AND SUBSTRATE PREPARATION

- A. Starting of work shall imply proper condition of substrate for receiving flooring and the conditions under which the installation is to be performed. Examine all surfaces to receive resilient flooring and do not proceed with the installation until unsatisfactory conditions have been corrected.
- B. Cementitious subfloors: Screeded and troweled to a level smooth plane surface free of score marks, grooves and depressions and within specified tolerances. Scrape free of dirt and foreign matter and brush clean.

3.02 GENERAL INSTALLATION REQUIREMENTS

- A. After patching and leveling compounds have dried apply primer, if recommended by flooring manufacturer for type of floor covering and conditions before applying adhesive.
- B. Use the proper adhesive for each type of resilient material and surface, without adulteration or reduction.
- C. Cover with adhesive only those areas of substrate which can be covered with flooring material within recommended working time of adhesive.
- D. Where not otherwise scheduled install resilient flooring and base for closets same as for adjoining room or space.
- E. Cut, fit, and scribe flooring material to fit neatly at walls, breaks, recesses, columns, pipes, door frames, cabinets, fixtures, equipment, saddles and edgings. Butt flooring tightly to other materials and surfaces.

3.03 INSTALLING SHEET VINYL & PLANK FLOORING

- A. Install material only over smooth, clean, dry, properly prepared subfloor.
- B. Fit borders accurately. Cut neatly to it around permanent fixtures and building features.
- C. Fit accurately to and level with adjoining floor surfaces or edging strips under doors.
- D. Roll in two directions with minimum 100 pound roller.
- E. Remove excess adhesive with damp cloth or soapy steel wool pad.
- F. Caulk where material abuts bathtub & thresholds.
- G. Protect tile with heavy paper after installation is complete.
- H. All work shall be in accordance with the manufacturers written instructions.

3.04 INITIAL CLEANING, PROTECTION, AND FINISHING

- A. Thoroughly clean resilient base, wall surfaces and door frames of excess adhesive and soiling caused by this installation. Do not use sandpaper, steel wool or cleaners which will damage surface finishes.
- B. Clean resilient flooring of dirt, surplus adhesives and other soiling caused by this installation, with neutral cleaner according to manufacturer's directions not sooner than five (5) days following installation.
- C. Remove stained and damaged resilient material at completion and install new acceptable material.

3.05 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpster provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

SECTION 09 68 00

CARPETING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for all carpeting work as shown on the drawings and specified hereinafter.

1.03 RELATED SECTIONS

- A. Vinyl base and resilient flooring: Section 09 65 16

1.04 GUARANTEE

- A. Carpeting shall be guaranteed by the subcontractor for a period of one year from the date of final acceptance against defects in materials and workmanship.

1.05 QUALITY ASSURANCE

- A. All carpet of each type furnished under this contract shall be produced by the same manufacturer. Seconds or imperfect material will not be accepted.
- B. Carpet for each unit of each type shall be from the same dye lot. Colors shall match approved samples. There shall be no streaking, color shading, color blending or color variation, due to the manufacturing process, apparent after the installation.
- C. Carpet and installation also shall conform to all applicable federal, state and local laws, codes and regulations.
- D. Employ only personnel skilled in laying carpet.
- E. Install carpet according to manufacturer's printed instructions.

1.06 DELIVERY AND STORAGE

- A. Have carpet delivered to project site only when spaces are ready to receive the carpet.

1.07 JOB CONDITIONS

- A. Install carpet in working areas with a temperature of at least 65 degrees F. Allow carpet to reach 65 degrees F. to 75 degrees F. temperature at least 24 hours before starting the installation.
- B. Normal room temperature of between 65 degrees F. and 75 degrees F. shall be maintained during the installation.

1.08 SUBMITTALS

- A. Shop drawings: Prepare and submit to the Owner a working layout for each special area for typical apartment of each type to be covered, showing the locations of all seams, the locations and types of edgings, and other pertinent details. If the installation proceeds without prior approval of seams, the field installation may be rejected if deemed unacceptable by the Architect and all repairs required shall be at the expense of the subcontractor.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Carpet shall be as manufactured by Shaw or approved equal.
Units - 100% nylon, 26 oz. cut pile.
- B. All carpet must be treated and certified to have passed the "Pill Test" and Steiner Tunnel Test, ASTM E-84 per code requirements. Carpet shall comply with UM-44D.
- C. All carpet shall meet state and city building code requirements.
- D. Colors for carpet shall be picked by the Architect from manufacturer's samples.
- E. Common area carpet, where shown on the drawings shall be Mohawk, step up II carpet tiles. Color by Architect.

2.02 CARPET PAD

- A. Carpet pad for units shall be "Performer" 3/8", 6 lb. density rebond or by General Felt Ind.
- B. All pad shall comply with all applicable building codes regarding flame spread, smoke development, pill test, etc. Provide certification showing compliance.

2.03 SUPPLEMENTARY MATERIALS

- A. Concrete patching compound: Latex type, Federal Specification SS-C-1302-B, compatible with adhesive and with Gypcrete, Lightweight Concrete, or other approved similar material.
- B. Metal edging and binding strips: Extruded aluminum alloy 6063-T5, with natural finish; William L. Bonnell Co. "Trimedge", Kinkead Industries, Inc. "Gripper Bar," Series 3000 Commercial, or Robert Consolidated Industries "Nap-Lok".
- C. Cleaning solvent for removing adhesives: Type recommended by carpet manufacturer, which will not soften or damage carpet.
- D. Tackless strip for carpet over separate cushion: Water resistant plywood strips with three rows of rust-resistant, evenly spaced, angular pins of proper length to penetrate carpet backing, but not to be seen from surface or to be a safety hazard; thickness to fit pad; Robert Smoothedges Tackless Carpet Gripper Type II or III, or approved equal.
- E. Seam tape: Minimum 2.5" wide, standard seaming tape.
- F. Seam cement: Type recommended by carpet manufacturer; non-flammable, waterproof.

- G. Carpet adhesive: Water based latex.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect substrate in each area to receive carpet for cracks, holes, depressions, spalling, roughness and other defects.
- B. If substrate or environmental conditions are unsuitable for laying carpet according to manufacturer's directions, do not start the installation until unsuitable conditions have been satisfactorily corrected.
- C. Do not begin carpet installation in each space until finish ceilings and walls, mechanical work, electrical work, painting and finishing, and other related work have been completed. Coordinate with Project Superintendent.
- D. Any irregularities shall be corrected through grinding and skim coating as required.

3.02 INSTALLING ACCESSORIES

- A. Install continuous metal edge strips at the exposed edge of carpet at a change in the floor finish, where carpet edge does not abutt a vertical surface, except where another type of threshold or saddle is to be provided under another section.
 - 1. Provide edging in single lengths, without joints, except where the lengths required exceed the edging manufacturer's standard.
 - 2. At doorways locate the edging under the door in its closed position.

3.03 INSTALLING CARPET - TACKLESS METHOD

- A. Install carpet and pad by the tackless method.
- B. Install tackless strip rigidly over subfloor at all walls and abutting surfaces using stub nails.
- C. Install carpet cushion over subfloors to receive carpet in the largest possible lengths, using a minimum number of sections.
 - 1. Butt the seams tightly and tape. Apply a slight stretch.
 - 2. Position cushion so that carpet seams will not fall directly over cushion seams.
 - 3. Trim cushion flush to the inside edge of tackless strip.
- D. Perform seaming for carpet according to the carpet manufacturer's directions to provide a breaking strength of not less than 100 pounds per lineal inch, straight shear at 120° F.
 - 1. If carpet construction requires it, treat the seam edges and cut edges with latex adhesive to prevent raveling.
 - 2. Use hot melt seaming system only if carpet manufacturer approves. Carpet backing must be compatible with adhesive.

- 3. Do not locate seams perpendicular to doorways or edges in a traffic pattern.
- E. Cut carpet for tight, neat fit against walls, columns, projections, recesses, stairs, railings and edge strips.
- F. Lay carpet in the same direction, wall-to-wall, and stretch it according to manufacturer's directions for percentage of stretch.
- G. Securely fasten carpet to the tackless strip so that all pins penetrate backing. Tuck all raw cut edges behind the tackless strips with no frayed edges or ends showing.
- H. Installation shall be in accordance with the "Essentials of Modern Carpet Installation", published by the Carpet and Rug Institute, Box 2048, Dalton GA.

3.04 PROTECTION AND CLEANING

- A. Remove all loose pieces of face yarn and thread with sharp scissors.
- B. Remove adhesive spots and soiled spots completely from exposed surfaces of carpet with proper solvent according to carpet manufacturer's directions.
- C. Leave the completed installation clean and free of soiling, spotting, staining and other defects.
- D. Clean up after work on a daily basis.
- E. Remove from the premises all scraps, wrappings, and trash resulting from the carpet installation, promptly after completion of installation in each area. Deposit same in receptacle designated by Project Superintendent.

3.05 RESTRETCHING

- A. If necessary, within one year after carpet has been installed by the "tackless" method, return and restretch loose, wrinkled, or buckled carpet areas.
- B. If necessary, repair seams, joints and edges during the re-stretching.

3.06 CLEANING

- A. Carpet shall be thoroughly vacuumed prior to final acceptance.
- B. No carpet shall be installed without the Architect's prior approval.

3.07 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor.

END OF SECTION

SECTION 09 91 00

PAINTING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for the completion of all painting work as shown on the drawings and specified hereinafter.
- B. Some minor items of painting included are as follows:
 - 1. Miscellaneous roof flashing, vents, louvers, etc. visible from ground level or from within the building (looking through windows) shall be painted to match roof.
 - 2. Wall vents and louvers and plumbing stack vents shall be painted to match adjacent materials (i.e., brick, etc.).
 - 3. Paint brick lintels to match brick.
 - 4. Exposed electric meter cabinets and disconnects, air conditioner disconnects and TV cable boxes mounted on building.

1.03 RELATED SECTIONS

- A. The following items are delivered to the job site pre-finished.
 - 1. Aluminum fascia, soffits, gutters and downspouts are prefinished: Sections 07 46 16 & 07 71 23
 - 2. Closet shelves and rods are prefinished: Section 10 57 23
 - 3. Cabinets and vanities are prefinished.
- B. The following items are to be delivered to the job shop primed:
 - 1. Interior wood doors are primed. Section 08 14 00
 - 2. Prehung exterior doors and frames: Section 08 16 13
 - 3. Wood trim shall be shop primed.
 - 4. Fiber Cement Siding: Section 07 46 46

- C. Ceiling texturing by Drywaller: Section 09 29 00

1.04 QUALITY ASSURANCE

- A. Request Architect's observation of first finished room, space or item of each finishing system for color, texture, sheen and workmanship. Upon approval, this room will be held as standard for quality and performance.

1.05 SUBMITTALS

- A. Data: Submit in writing the names of manufacturers proposed and a complete list of all products proposed for use, including identifying product names and catalog numbers.
- B. Samples: Submit approved manufacturer's color chips of colors specified in Color Schedule.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be delivered to job site factory mixed, ready for application, except for tinting of undercoats and possible thinning, and in manufacturer's original unopened containers. Each container shall bear the manufacturer's label, showing name, brand, type, and color of paint, instructions for thinning, and type and percentages of pigment, vehicle, and solvent.
- B. Store materials within a building in a single place. Keep storage place clean. Repair and correct all damage to space. Do not store paint in closets.
- C. Remove oily rags and oil or solvent soaked waste from building at end of each work day and take every precaution to avoid danger of fire.

1.07 JOB CONDITIONS

- A. Unless otherwise permitted by material manufacturer's printed instructions, apply paints only when temperatures of surfaces to be painted and surrounding air temperatures are between 50 degrees F. and 90 degrees F. for water based paints and between 45 degrees F. and 95 degrees F. for solvent thinned paints. Apply interior enamels and varnishes at temperatures between 65 degrees F. and 95 degrees F.
- B. Do not apply paint in snow, rain, fog, or mist, or when relative humidity exceeds 85% nor to damp, wet, or hot surfaces, unless otherwise permitted by manufacturer's printed instructions.
- C. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.
- D. Avoid painting under conditions which might result in condensation on freshly painted surfaces.
- E. Do not apply finishes in spaces where dust is being generated.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Paint schedule is based primarily on Sherwin Williams & PPG. Equal manufacturers shall be considered by the Architect, provided the colors picked are available from the equal manufacturer.
- B. All paints shall be Greenguard Gold Certified.
- C. Acceptable manufacturers are as follows:
 - 1. Glidden/PPG.
 - 2. Sherwin Williams with exact color match. Color match to be approved by Architect.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine surfaces scheduled to receive paint or finishes for conditions that will adversely affect execution, performance or quality of work, and which cannot be placed into acceptable condition through preparatory work included herein under "Preparation of Surfaces".
- B. Do not proceed with painting work in each space or location until unsatisfactory conditions have been corrected in a manner acceptable to applicator. The beginning of work in a specific area shall be construed as acceptance of the surfaces by the applicator as satisfactory to produce proper finished surfaces.

3.02 USE OF MATERIALS

- A. Type of material for each coat, location, and use shall be as designated for that purpose by manufacturer, as specifically stated in manufacturer's published specifications.
- B. Inter-mix, thin, and apply only in accordance with manufacturer's latest published directions.
- C. Vary sealers and undercoats only where necessary to suit the particular manufacturer's recommendations for obtaining equivalent quality or finish.
- D. Apply primers indicated in the schedule only on new unprimed surfaces or where shop coats are damaged or where it has been necessary to remove existing paint from surfaces. Omit scheduled primer from previously painted surfaces that are in sound condition and of uniform porosity.

3.03 PREPARATION OF SURFACES

- A. The painting contractor shall be wholly responsible for finish of his work and, therefore, shall not commence with any part of it until surface is in proper condition in every respect. If painting contractor considers any surface so unsuitable for proper finish of his work that it cannot be repaired by slight sanding, he shall notify the General Contractor of this fact in writing before any materials are applied and he shall not apply any materials until surfaces

have been made satisfactory. Painting subcontractor shall repaint at his own expense all defective work which is not brought to the attention of the General Contractor prior to painting.

- B. All knots or sappy spots shall be given one (1) coat of shellac at least two (2) hours before painting.
- C. All necessary puttying of nail holes, cracks and blemishes shall be done after prime coat has become hard and dry and before second coat is applied.
- D. All greasy or oily metal surfaces shall be cleaned with turpentine or naptha before applying any materials. All scale or rust shall be removed by scraping or wire brushing.

3.04 WORKMANSHIP

- A. All work shall be done in a workmanlike manner by skilled mechanics. All materials shall be evenly spread and smoothly flowed on and shall be free from runs and sags; no paint, varnish, or enamel shall be applied until preceding coat is thoroughly dry and hard.
- B. No exterior painting shall be done in rainy, damp or frost weather until surface is thoroughly dry and hard.
- C. No interior painting or finish shall be permitted until building has been thoroughly dried out and cleaned out. No exterior painting shall be done in temperatures below 40 degrees F. This contractor shall be responsible for cleaning all surfaces to be painted.
- D. Enamel shall be allowed to dry at least 48 hours between coats unless noted in the detail specifications and shall be sanded lightly between coats with No. 220 sandpaper and dusted before succeeding coat is applied.
- E. After applying paste wood fillers excess shall be carefully and neatly cleaned from surface by rubbing across grain; all nail holes shall be filled with putty. (Sand after hard.)
- F. At completion, all work shall be touched up and the finish, where damaged, shall be restored and left in good condition. Paint top and bottom edges of doors with one prime coat and one finish coat after fitting.
- G. Apply material evenly and uniformly under adequate illumination, completely covering surfaces, smooth and free from runs, sags, holidays, clogging and excessive flooding. Completed surfaces shall be free of brush marks, air bubbles, dust, excessive roller stipple, and other imperfections.
- H. The number of coats specified are minimum number acceptable, shall product a fully covered finish, and must be applied in heavy body, without improper thinning. When stain, dirt, or undercoats show through the final coat of paint, correct the defects and cover the surfaces with additional coats until the coating or paint film is of uniform finish, color, appearance, and coverage, without additional cost to the General Contractor.
- I. Apply paint at such rates of coverage that the fully dried film thickness for each coat will not be less than recommended by the manufacturer. Do not exceed the rate of coating application recommended by the manufacturer for the surface and purpose involved.

- J. Brush or roll finish coat on gypsum board; the first coat over gypsum board may be sprayed. If spraying is used, the walls must be sanded of raised knap on drywall prior to final coat. Brush all coats on doors and trim. (Doors and trim may be sprayed if the contractor can show that the proper quality can be produced without any runs and over spray.) Apply block filler with brush or roller. Brush the coats on metals.

3.05 PROTECTION

- A. Protect carefully all adjacent surfaces not being painted concurrently or not to be painted. Give particular attention to electric outlets, switches, finish hardware, flooring, ceramic tile, and quarry tile.
- B. Use drop cloths or similar temporary covers to protect finish flooring, cabinet work, and other surfaces subject to damage.
- C. Where it becomes necessary to remove previously erected temporary coverings placed by other trades, replace in a proper manner. If these coverings cannot be replaced, protect work in some other satisfactory manner.

3.06 CLEANING

- A. Clean up after painting on a daily basis and deposit trash in receptacles provided.
- B. After completion of work remove from premises all rubbish and accumulated materials caused by this work.
- C. Clean all paint spots, oil and other soiling from prefinished surfaces with integral finish. Use solvents for metal work which will not damage finished surface. Do not mar surface finish of item being cleaned.

PART 4 SCHEDULE

4.01 EXTERIOR PAINT

- A. Exterior Steel
 - 1. One (1) coat Dev Flex #4080.
 - 2. One (1) coat Lifemaster Acrylic Semi-Gloss #4216.
- B. Fiber Cement Siding
 - 1. Fiber Cement Siding is to be primed by manufacturer. All cut pieces are to be primed and painted before installation.
 - 2. Two (2) coats SW A-100 Exterior Latex Satin Extra.
- C. Exterior Doors
 - 1. Unit is shop primed - touch-up primer, if necessary. Jambs must be primed with gripper on site, then finish coated.

2. One (1) coat SW A-100 Exterior Latex Satin Extra Exterior Satin.
Note: If coverage is not acceptable with one coat, a second coat shall be applied.

D. Miscellaneous Decorative Trim Items and louvers

1. Two (2) coats SW A-100 Exterior Latex Satin. Custom mix to match adjacent trim, siding or brick as applicable. Color match to be approved by Architect.

4.02 INTERIOR PAINT

A. Interior Metals

1. One (1) coat Aquacrylic Gripper #3210.
2. One (1) coat #1403 Interior Acrylic Ultra Dulux Wall and Trim Paint.

B. Drywall walls and smooth ceilings (listed as Flat in Finish Schedule)

1. One (1) coat Interior Latex Flat #1250. Spray all walls and ceilings with one (1) coat Antique White.
2. One (1) coat Ultra Hide 150 Interior Flat Latex Wall Paint #1210. Color to be Bone White.

C. Drywall walls and smooth ceilings (listed as Eggshell in Finish Schedule)

1. One (1) coat Interior Latex Flat #1250. Spray walls and ceilings with one (1) coat of Antique White.
2. One (1) coat Interior Ultra Hide 150 Eggshell #1412 - Bone White.

D. Interior trim and doors (to be painted)

1. Units are primed.
2. Two (2) coats Interior Ultra Hide 150 Lo Luster.

4.03 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work, and as work progresses, or upon request of the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 10 28 16

BATH & RESTROOM ACCESSORIES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment, and services necessary for all bathroom accessories as shown on the drawings and specified hereinafter (Installation by carpenter).

1.03 RELATED SECTIONS

- A. Wood Blocking: Section 06 11 00
- B. Interior Finish Carpentry: Section 06 20 23

1.04 SUBMITTALS

- A. Immediately upon receipt of contract this contractor shall submit cut sheets and shop drawings of all equipment, showing all installation details and all accessory clips and fasteners necessary to the Architect for approval.

1.05 STORAGE AND HANDLING

- A. Upon delivery to the site, all materials shall be carefully stacked, neatly piled, and properly protected from the weather and other damage.
- B. Materials which are damaged due to any cause shall be rejected for use and replaced with new materials at no cost to the Owner.

1.06 QUALITY ASSURANCE

- A. Provide accessories of matching design from the same manufacturer, unless otherwise specified or approved.
- B. Except where specifically approved as exposed for specified items, accessories shall be designed for mounting with concealed fasteners.
- C. Each item shall be furnished with loose fasteners and mounting devices. Accessories shall be wrapped and packed individually to prevent damage or loss during shipment and handling.
- D. Zinc alloy (Zamak) shall conform to ASTM B86.

PART 2 PRODUCTS

2.01 MATERIALS - GENERAL

- A. All medicine cabinets, framed mirrors, and bathroom accessories shall be as manufactured by Taymor, Nutone and American Specialties, Inc. Approved equals by Lawson, Bobrick, or Tubular Specialties.
- B. Provide installation accessories for all items supplied under this contract necessary for a complete job.
- C. Per manufacturers listed under item (A) above, there is a schedule of equipment and model numbers on the drawings to be supplied according to unit types and rooms. This supplier is also referred to the unit plans and interior elevations for locations, mounting and quantity of items.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install equipment according to the manufacturer's instructions, complete and ready for use. Use manufacturer supplied fasteners with finish to match (where screws are exposed).
- B. Provide necessary inserts, screws, bolts, and other accessory items or suitable anchorage to support.

3.02 CLEAN UP

- A. This Subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 10 55 13

MAILBOXES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for all mail box work. Provide all accessory pieces needed for a complete mailbox installation.

1.03 SHOP DRAWINGS

- A. Immediately upon receipt of contract, this contractor shall submit shop drawings to the Architect for approval. These drawings shall list unit sizes, rough opening size, installation details, box numbering system and style, finish, and key lock type.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Mailboxes shall be front loading mailboxes with matching snap-on 1/4" x 1-3/4" trim as manufactured by Florence. Model numbers as listed on the drawings.
- B. Front of boxes and trim to be finely polished clear brushed anodized finish extruded aluminum.
- C. Numbers to be 1/2" high engraved on solid 1/4" thick extruded aluminum doors, in accordance with postal regulations. (See numbering layout on drawings.)
- D. Boxes to be equipped with five (5) pin cylinder lock with cam latches, keyed independently of apartment doors. Four (4) keys with each door.
- E. Boxes shall be numbered vertically from left to right consecutively as shown on the drawings. Extra boxes to be left blank.
- F. Provide integral Independent Mail Collection Box as shown on drawings.
- G. Master compartment door shall have provision to receive lock provided by U. S. Postal Service.

2.02 REGULATIONS

- A. The mailboxes shall be in conformance with all federal and local postal regulations (current edition at time of installation).

PART 3 EXECUTION

3.01 INSTALLATION

- A. Mail boxes shall be installed in openings provided by others in accordance with the details on the drawings, the manufacturer's printed instructions and U. S. Postal Regulations.
- B. Units shall be set level and plumb. Shim as required and fasten with concealed fasteners. Install snap-on trim at completion of installation.

3.01 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work, and as work progresses, or upon request of the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 10 57 23

CLOSET SHELVING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for all prefinished shelving and closet rods as shown on the drawings and hereinafter specified.

1.03 SUBMITTALS

- A. This contractor shall submit shop drawings to the Architect for approval of all metal shelving and rods. These submittals shall include cut sheets, specifications, color samples and installation details.

1.04 STORAGE AND HANDLING

- A. This subcontractor shall deliver all materials to the job site, unload and store in an area as directed by the General Contractor. Any damaged materials shall be replaced by this supplier at his own expense.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All shelving shall be Closet Maid vinyl clad steel rod shelving by Clairson International, Ocala FL, with equals by Sani-Shelf.
- B. All ventilated steel rod shelving shall be constructed of Grade C1008 cold drawn basic steel rod, 100,000 psi tensile strength. Top rods are spaced 1" o.c. and welded to the main rods by resistance method in accordance with best welding standards.
- C. Shelving shall be cleaned and phosphated to insure a perfect bond of epoxy plastic coating to the steel. It is then coated in an automatic electrostatic spray system, where the epoxy is fused on the steel and cured, providing a continuous coating on all surfaces.
- D. Shelving shall be as shown on the drawings. Units shall be complete with end bracket, backwall clip anchor, down clip, off the wall support bracket, pole support with clips and anchors, etc. as required for a complete job. Items shall be as follows:
 - 1. Linen shelves - #315-#7315.
 - 2. Shelf and rod - #300/#7300.

3. Angle support bracket - XSB-#164.
Use down clips #983/#977 or cable clip #312 at all wall connections where ever angle supports are installed.
4. End wall bracket - #972.
5. Wall clips - #970/#971. (Use down clips at angle support brackets) - space at 10" to 12" apart.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install shelving according to manufacturer's instructions, using all necessary support braces, end brackets, clip anchors, etc. for a complete, secure installation. Shelves shall be anchored to studs wherever possible. In areas where studs are not spaced correctly drywall anchors may be used to supplement anchors into studs. (Anchors shall be supplied by manufacturer or shall be approved by manufacturer.) All shelves shall extend from wall to wall with end bracket mounts. In corners shelves shall overlap so that each shelf has an end bracket support. Linen shelves with an open end shall use a pole support or angled wall bracket.
- B. For normal usage, it is recommended to provide intermediate support braces so that spans do not exceed 3"-6" on shelf and rod shelving, and 4'-0" for linen/storage shelving. Shelving will withstand a static load of 75 pounds per square foot when spans do not exceed 3'-0". Provide angled support bracket for spans exceeding lengths listed. Use down clip anchors at support bracket locations.
- C. Shelving can be pre-cut or cut to length on the job using a power tool, bolt cutter or hack saw. Plastic end caps shall be used to cover cut ends.
- D. Mounting hardware shall be manufacturer's components for attaching shelving to drywall without requiring mounting to concealed wall structural members.

3.02 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials which may result from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors in broom clean condition in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 11 31 00

APPLIANCES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary to complete all appliance work as shown on the drawings and specified hereinafter.

1.03 RELATED SECTIONS

- A. Electrical work: Division 26

1.04 SUBMITTALS

- A. Immediately upon receipt of a contract or purchase order this supplier shall submit shop drawings to the Architect for approval. These submittals shall include cut sheets, specifications, color samples, and installation details, along with rough opening sizes for all residential equipment. After receiving approval this supplier shall provide additional copies as required to the subcontractors involved in providing rough-in, installation, and hook ups.

1.05 DELIVERY AND HANDLING

- A. Appliances shall not be delivered until the building is secured and finish flooring and cabinets have been installed. This supplier shall be responsible for delivery, unloading and transporting into the building, unpacking, and setting in place. Any damage occurring during the shipping and handling shall be the responsibility of this supplier and shall be corrected at his expense.

1.06 QUALITY ASSURANCE

- A. Furnish manufacturer's standard warranty covering each appliance for a period of not less than one year.
- B. Appliances damaged during shipment and handling or by construction activities will not be accepted.
- C. Electric appliances shall be Underwriters Laboratories, Inc. listed.
- D. All electric appliances shall be products of the same manufacturer unless otherwise specified or approved.
- E. Where appliances are to be built into or assembled with wood cabinets or countertops, coordinate the dimensions and details with other trades.

1.07 WARRANTIES

- A. Furnish the manufacturer's standard warranty and operating manual for each appliance.
- B. Complete the warranty cards furnished by the manufacturer with the appliances. On each card designate the location of appliance by apartment number or other identifying location name.

PART 2 PRODUCTS

2.01 GENERAL

- A. All appliances shall be as listed by General Electric with approved equals by Whirlpool.
- B. See Schedule on drawings.

PART 3 EXECUTION

3.01 INSPECTION AND PREPARATION

- A. Check controlling dimensions of spaces for appliances and do not attempt to install an appliance until the space is correctly prepared to receive it. Take particular note of outlet locations.
- B. Coordinate outlet locations with construction of ranges and other appliances so that the units can be installed against rear wall without interference.

3.02 INSTALLATION

- A. Assemble the uncrated appliances, where assembly is necessary, and set each into place, free of damage and blemishes.
- B. Adjust the leveling screws to level all floor mounted appliances.
- C. Provide minimum 4" space above each refrigerator, 3" behind unit (1" behind coils) plus 1/2" "push-in" side clearance.
- D. Electrical connections for direct connect appliances and outlets for other appliances are specified under Division 16.
- E. Install cord and plug on all units unless already factory installed.
- F. Provide and attach water and discharge lines to washer. Secure discharge line with a strap to prevent line from coming out of laundry box standpipe during washer operation.
- G. Provide and attach section of metal 4" dryer duct from dryer to piping installed by others. Provide metal clamp at connection on each end of flexible duct.

3.03 COMPLETION

- A. After electrical outlets have been installed and connections made, place units in operation and check each appliance for proper performance. Correct improper functioning found, if any.
- B. Remove all masking and temporary protection from exterior and interior of each appliance.
- C. Remove from the premises all debris and trash resulting from residential appliance work.

3.04 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials which may result from his work, and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property, and leave all floors in broom clean condition in areas affected by his work. Boxes and debris from appliances may not be disposed of in the General Contractor's dumpsters. This supplier shall remove all items from the job site. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 12 12 13

BLINDS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment, and services necessary for all vertical and horizontal blinds as shown on the drawings and specified hereinafter.

1.03 RELATED SECTIONS

- A. Wood blocking by Carpenter: Section 06 11 00

1.04 SUBMITTALS

- A. Immediately upon receipt of contract this contractor shall prepare and submit product and shop drawings to the Architect for approval. Submittal shall include cut sheets, color samples and installation details. Provide a sample blind with head channel, wand and installation brackets for review and approval.
- B. Prior to fabrication this subcontractor shall field measure all window and door openings and shall be responsible for the correct fit of all items into the openings as they exist at time of field measuring.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Mini-Blinds
 - 1. All mini-blinds shall be Graber "Lake Forest". Units shall be prefinished 1" horizontal vinyl slats.
 - 2. Units shall be complete with manufacturer's standard head channel, tilter wand, cord lock, drum and cradle, installation brackets, and bottom rail. All items except wand (clear acrylic) shall be prefinished to match, color by Architect.
 - 3. Blinds shall be installed on all windows.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify that the work in which the blinds will be installed is free of conditions that interfere with blind installations and operations. Begin blind installation only when unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install blinds in accordance with manufacturer's installation procedures except as otherwise specified herein.
- B. Install intermediate support brackets and extension brackets as needed to prevent deflection in head rail.
- C. Install blinds with adequate clearance to permit smooth operation of blinds and any sash operators. Hold blinds 1/4" clear from each side of window opening on inside mount unless other clearance is indicated.
- D. Set tilt and locking controls. Demonstrate blinds to be in smooth, uniform working order.

3.03 CLEANING

- A. Clean soiled blind surfaces with a mild soap solution. Do not use steam, hot water, bleach or any abrasive or solvent based cleaners. Do not wash metallic colors.

3.04 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 12 32 00

CABINETS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services needed for all cabinet and counter work as shown on the drawings and specified hereinafter (including unloading and storage, if necessary).

1.03 RELATED SECTIONS

- A. Installation of sinks is by Plumbing Contractor.

1.04 COORDINATION WITH OTHER TRADES

- A. This contractor shall coordinate his work with other trades having work to be installed by others in cabinetry. All cut outs for sinks, panels, appliances, plumbing and electrical work shall be as shown on the drawings; however, the sizes of all these openings shall be obtained from the respective trades through the General Contractor in writing. Once this information has been received it shall be the responsibility of this contractor to provide these cut outs correctly. Any errors on the part of this contractor shall be at his expense.

1.05 SUBMITTALS

- A. Immediately upon receipt of a contract or purchase order this supplier shall submit shop drawings to the Architect for approval. These submittals shall include cut sheets, specifications, color samples, hardware and installation details along with rough opening sizes for all residential equipment. After receiving approval this supplier shall provide additional copies as required to the subcontractors involved in providing rough-in installation and hook-ups. Cabinet supplier shall submit a sample cabinet.

1.06 DELIVERY AND HANDLING

- A. All cabinetry shall be shipped to the job with protective packing material on corners and edges to prevent damage to items during shipping and handling. Any items damaged during this period shall be replaced by this contractor at his own expense. Once cabinets are turned over to the General Contractor at the job site, all damaged items shall be replaced by this contractor but at the expense of the General Contractor or other trades involved in the damaging.

1.07 QUALITY ASSURANCE

- A. Cabinets shall be manufactured in a properly equipped factory or shop of a reputable manufacturer specializing in such products.

- B. Fabricated cabinets shall surpass the minimum standards of ANSI A161.1 "Recommended Construction and Performance Standards for Kitchen and Vanity Cabinets" and shall be NKCA approved and carry a certification label.
- C. Cabinet hardware shall conform to or surpass applicable requirements of ANSI A156.9.
- D. Plastic laminate tops shall conform to specifications of National Association of Plastic Fabricators QSI, latest edition. Fabricate tops to field dimensions where dimensions are critical.

PART 2 PRODUCTS

2.01 CABINETS - GENERAL

- A. Cabinet suppliers and manufacturers shall review the following specification and base their bid on this type and quality cabinet or a standard cabinet in the manufacturer's line that equals or exceeds the standards listed for quality and appearance. Provide sample cabinet with bid for review of Owner.
- B. Cabinets shall be prefabricated, pre-assembled and prefinished residential modular unit base and wall cabinets (sizes as shown on the drawings). Finish shall be prefinished oak. Color by Architect.

2.02 CABINETS - CONSTRUCTION

- A. Cabinets shall be Maple panel-in-frame doors by Grandview with equals by Armstrong or Saco. Color by Architect.
- B. Cabinets shall be wood or particle board construction. Exterior face of cabinet and doors shall be maple hardwood. Interior of cabinets and shelves shall be low or high pressure laminate. Supplier shall submit a sample for approval.
- C. All doors shall have routed pulls and self-closing hinges (brushed nickel finish). Architect shall select hardware from manufacturer's standard samples.

2.03 COUNTERTOPS

- A. Plastic laminate shall be Wilson Art.
- B. Provide backsplashes and end splashes on all kitchen and vanity tops that abut walls.
- C. Countertops shall be constructed of the following:
 - 1. Core: 3/4" particle board construction.
 - 2. Surfacing, Type #1: NEMA LD3, Type GP-50 (general purpose), .050" thick; patterns and colors selected from laminate manufacturer's standard; Nevamar Corporation Horizontal Grade H-5, Wilson Art, Micarta or approved equal. (Square edged tops.)
 - 3. Surfacing, Type #2: NEMA LD3, Type PF-42 (post forming), patterns and colors selected from laminate manufacturer's standard; Nevamar Corporation HF-5 Horizontal Post Forming Grade 11, Wilson Art, Micarta or approved equal.
 - 4. Adhesive for bonding laminate to core: waterproof, rigid-setting type recommended by laminate manufacturer.

- D. Plastic top sheets shall be bonded to core in conformance with applicable tests and requirements for Type #1 waterproof bond in Fed. Spec. LT-0041.
 - 1. Tops shall be fabricated to field measurements without joints, except where mitered corners are required.
 - 2. Where field joints occur the abutting ends of countertops shall be secured with Knappe and Vogt Company Tite-Joint Fasteners.
- E. Countertops and splashes shall be fabricated as follows: (Provide radius corner on vanity top corner)
 - 1. Countertops, Type #1: General purpose grade plastic laminate, with all exposed edges self-edged including edges adjacent to appliances. Backsplashes shall be 3-3/4" high., unless otherwise shown on drawings.
 - 2. Countertops, Type #2: Post forming grade plastic laminate with coved backsplash and rolled front edge. Open ends and ends adjacent to appliances shall be closed with plastic laminate. End splashes shall be 3-3/4" high, shop fabricated and glued to tops. in field. Cove radius shall not exceed 1/2".
- F. Sink and lavatory cut outs shall be made at mill to fit sink and lavatory rims or self rimming units specified under other sections.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Set base and wall cabinets level, plumb, in line and with faces of each assembly in same plane. Securely anchor side-to-side and to floor or walls with flat head plated screws in concealed locations. Do not nail cabinets to walls.
- B. Firmly attach both bottom and top of wall cabinets to studs within wall.
- C. Neatly fit and scribe to adjacent work. Provide matching wood fillers or moldings if necessary to close space at walls.
- D. Install all loose hardware furnished with the cabinets. Align doors and adjust hardware for doors and drawers to operate properly.
- E. Attach countertops securely to base units with concealed screws. Loose backsplashes and endsplashes shall be set in silicone sealant and caulked to countertop with clear silicone.
- F. When bar tops are secured using construction adhesive, brace tops in final position until the adhesive has adequate time to dry.

3.02 CLEANING

- A. After installation remove all masking and temporary protection. Clean the cabinet units outside and inside.

3.03 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 14 24 00

ELECTRIC TRACTION ELEVATOR

PART 1 - GENERAL

1.01 General Requirements

- A. Reference is made to the Instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 Section Includes

- A. This Section specifies electric traction elevators.
- B. Work Required:
 - 1. The work required under this section consists of all labor, materials and services required for the complete installation (including operational verification) of all the equipment required for the elevator(s) as herein specified.
 - 2. All work shall be performed in a first class, safe and workmanlike manner.
 - 3. In all cases where a device or part of the equipment is herein referred to in the singular, it is intended that such reference shall apply to as many of such devices or parts as are required to make complete installation.
- C. Applicable Codes: Comply with applicable building and elevator codes at the project site, including but not limited to the following:
 - 1. ANSI A117.1, Buildings and Facilities, Providing Accessibility and Usability for Physically Handicapped People.
 - 2. ADAAG, Americans with Disabilities Act Accessibility Guidelines.
 - 3. ANSI/NFPA 70, National Electrical Code.
 - 4. ANSI/NFPA 80, Fire Doors and Windows.
 - 5. ASME/ANSI A17.7, Safety Code for Elevators and Escalators.
 - 6. ANSI/UL 10B, Fire Tests of Door Assemblies.
 - 7. CAN/CSA C22.1, Canadian Electrical Code.
 - 8. CAN/CSA-B44, Safety Code for Elevators and Escalators.
 - 9. EN 12016 (May 1998): "EMC Product Family Standards for lifts, escalators, and passenger conveyors Part 2 – immunity"
 - 10. Local Building Codes.
 - 11. OBC Section 3002.4 Elevator Car to accommodate ambulance stretcher
 - 12. All other local applicable codes.

1.02 SYSTEM DESCRIPTION (See drawings)

- A. Equipment Description: Schindler 3300 Low Rise Machine -Room Less Traction Elevator.
- B. Quantity of Elevators: 1
- C. Stops: 5

- D. Rated Capacity: 3500 lb.
- E. Rated Speed: 100 fpm,
- F. Main Power Supply: 208 - Volts, 3-Phase, 60Hz
- G. Car Lighting Power Supply: 120 Volts, Single-phase, 15 Amp, 60 Hz.
- H. Hoistway Entrance Dimensions: 3' 6" Wide X 7' 0" High
- I. Travel Limits: 30' 6"
- J. Power Supply: 208
- K. Cab Inside Dimensions: 6' 9-5/16" Wide X 5' 6-7/8" Deep
- L. Cab Width: 6' 9 5/16"
- M. Cab Depth: 5' 6 7/8" Cab Handrail Mounting: Rear & Side Walls
- N. Cab Handrail Type and Finish: Rectangular Brushed Aluminum - Return End
- O. Machine and Controller Location: No machine-room required, tank and controller in hoistway pit.
- P. Signal Fixtures: Manufacturer's standard with stainless steel metal button targets (exc. CA).
- Q. Stopping Accuracy: $\pm 1/4"$ (6.4 mm) under any loading condition or direction of travel.
- R. Operation: Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.
- M. Operating Features – Standard
 - 1. Full Collective Operation
 - 2. Anti-nuisance.
 - 3. Fan and Light Protection.
 - 4. Load Weighing Bypass.
 - 5. Independent Service.
 - 6. Full Collective Operation.
 - 7. Firefighters' Service Phase I and Phase II
 - 8. Top of Car Inspection.
- N. Door Control Features:
 - 1. Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.
 - 2. Elevator doors shall be provided with a reopening device that will stop and reopen the car door(s) and hoistway door(s) automatically should the door(s) become obstructed by an object or person.
Door protection shall consist of a two dimensional, multi-beam array projecting across the car door opening.

3. Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each system proposed for use. Include the following:
 1. Signal and operating fixtures, operating panels and indicators.
 2. Cab design, dimensions and layout.
 3. Hoistway-door and frame details.
 4. Electrical characteristics and connection requirements.
 5. Expected heat dissipation of elevator equipment in hoistway (BTU).
 6. Color selection chart for Cab and Entrances.
- B. Shop Drawings: Submit approval layout drawings. Include the following:
 1. Car, guide rails, buffers and other components in hoistway.
 2. Maximum rail bracket spacing.
 3. Maximum loads imposed on guide rails requiring load transfer to building structure.
 4. Clearances and travel of car.
 5. Clear inside hoistway and pit dimensions.
 6. Location and sizes of access doors, hoistway entrances and frames.
- C. Operations and Maintenance Manuals: Provide manufacturer's standard operations and maintenance manual.

1.04 QUALITY ASSURANCE

- A. Manufacturer: Minimum of fifteen years experience in the fabrication, installation and service of elevators of the type and performance of the specified. The manufacturer shall have a documented quality assurance program.
- B. Installer: Elevators shall be installed by the manufacturer.
- C. Permits, Inspections and Certificates: The Elevator Contractor shall obtain and pay for necessary Municipal or State Inspection and permit as required by the elevator inspection authority, and make such tests as are called for by the regulations or such authorities. These tests shall be made in the presence of such authorities or their authorized representatives.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Should the building or the site not be prepared to receive the elevator equipment at the agreed upon date, the General Contractor will be responsible to provide a proper and suitable storage area on or off the premises.

Should the storage area be off-site and the equipment not yet delivered, then the elevator contractor, upon notification from the General Contractor, will divert the elevator equipment to the storage area. If the equipment has already been delivered to the site,

then the General Contractor shall transport the elevator equipment to the storage area. The cost of elevator equipment taken to storage by either party, storage, and redeliver to the job site shall not be at the expense of the elevator contractor.

1.06 WARRANTY

- A. The elevator contractor's acceptance is conditional on the understanding that their warranty covers defective material and workmanship. The warranty period shall not extend longer than one (1) year from the date of completion or acceptance thereof by beneficial use, whichever is earlier, of each elevator. The warranty excludes: ordinary wear and tear, improper use, vandalism, abuse, misuse, or neglect or any other causes beyond the control of the elevator contractor and this express warranty is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.

1.07 MAINTENANCE & SERVICE

- A. Maintenance service consisting of regular examinations and adjustments of the elevator equipment shall be provided by the elevator contractor for a period of twelve (12) months after the elevator has been turned over for the customer's use. This service shall not be subcontracted but shall be performed by the elevator contractor. All work shall be performed by competent employees during regular working hours of regular working days. This service shall not cover adjustments, repairs or replacement of parts due to negligence, misuse, abuse or accidents caused by persons other than the elevator contractor. Only genuine parts and supplies as used in the manufacture and installation of the original equipment shall be provided.
- B. The elevator control system must:
 - 1) Provide in the controller the necessary devices to run the elevator on inspection operation.
 - 2) Provide on top of the car the necessary devices to run the elevator in inspection operation.
 - 3) Provide in the controller an emergency stop switch. This emergency stop switch when opened disconnects power from the brake and prevents the motor from running.
- C. Provide system capabilities to enable a remote expert to create a live, interactive connection with the elevator system to enable the following functions:
 - 1. Remotely diagnose elevator issues with a remote team of experts
 - 2. Remotely return an elevator to service
 - 3. Provide real-time status updates via email
 - 4. Remotely make changes to selected elevator functions including:
 - a. Control building traffic: Restrict floor access, remove car from group operation, shut down elevator, select up peak / down peak mode, activate independent service
 - b. Conserve energy: Activate cab light energy save mode, activate fan energy save mode, shut down car(s)

- c. Improve passenger experience: Extend door open times, change parking floor, activate auto car full, activate anti-nuisance, advance door opening, door nudging, extend specific floor extended opening time, release trapped passengers

PART 2 - PRODUCTS

2.01 DESIGN AND SPECIFICATIONS

- A. Basis for Design Manufacture: Provide 3300 Low Rise Machine -Room Less Traction Elevator from Schindler Elevator Corporation. The control system and car design based on materials and systems manufactured by Schindler Elevator Corporation. Specifically, the system shall consist of the following components:
 - 1. The entire hydraulic system and the controller shall be located inside the hoistway. No extra machine room or control closet space is required.
 - 2. Sleep mode operation for LED ceiling lights and car fan.
 - 3. LED lighting standard in ceiling lights and elevator fixtures.

2.02 EQUIPMENT: MACHINE COMPONENTS

- A. A microprocessor-based controller shall be provided, including necessary starting switches together with all relays, switches, solid-state components and hardware required for operation, including door operation, as described herein. A three (3) phase overload device shall be provided to protect the motor against overloading. The controller shall be located together with the hydraulic system in the hoistway pit and be easily accessible for maintenance through the same access door that is also used for the hydraulic system.
- B. A manual lowering feature shall permit lowering the elevator at slow speed in the event of power failure or for adjusting purposes.
- C. Drive: A Variable Voltage Variable Frequency AC drive system shall be provided. The drive shall be set up for regeneration of AC power back to the building grid

2.03 EQUIPMENT: HOISTWAY COMPONENTS

- A. A. Machine: AC gearless machine, with a synchronous permanent-magnet motor, dual solenoid service and emergency disc brakes, mounted at the top of the hoistway.
- B. Governor: The governor shall be a tension type car-mounted governor.
- C. Buffers, Car, and Counterweight: Polyurethane type buffers shall be used for speeds of 150 and 200 feet per minute. Oil buffers shall be used for a speed of 350 feet per minute.
- D. Hoistway Operating Devices:
 - 1- Emergency stop switch in the pit.
 - 2- Terminal stopping switches.
- E. Positioning System: Consists of an encoder, reader box, and door zone vanes.

- F. Guide Rails and Attachments: Guide rails shall be Tee-section steel rails with brackets and fasteners. Side counterweight arrangements shall have a dual-purpose bracket that combines both counterweight guide rails, and one of the car guide rails to building fastening.
- G. Coated-Steel Belts: Polyurethane coated belts with high-tensile-grade, zinc-plated steel cords and a flat profile on the running surface and the backside of the belt. The belts shall have an FT-1 rating as referenced by NFPA 13. All driving sheaves and deflector sheaves should have a crowned profile to ensure center tracking of the belts. A continuous 24/7 monitoring system using resistance-based technology has to be installed to continuously monitor the integrity of the coated steel belts and provide advanced notice of belt wear.
- H. Governor Rope: Shall be steel and shall consist of at least eight strands wound about a sisal core center.
- I. Fascia: Galvanized sheet steel shall be provided at the front of the hoistway.
- J. Hoistway Entrances:
 - 1- Frames: Entrance frames shall be of bolted construction for complete one-piece unit assembly. All frames shall be securely fastened to fixing angles mounted in the hoistway and shall be of UL fire rated steel.
 - 2- Sills shall be extruded: Nickle Silver
 - 3- Doors: Entrance doors shall be of metal construction with vertical channel reinforcements.
 - 4- Fire Rating: Entrance and doors shall be UL fire rated for 1-1/2 hour
 - 5- Entrance Finish: Satin Stainless Steel
 - 6- Entrance Marking Plates: Entrance jambs shall be marked with 4" x 4" (102 mm x 102 mm) plates having raised floor markings with Braille located adjacent to the floor marking. Marking plates shall be provided on both sides of the entrance.
 - 7- Sight Guards: Sight guards will be furnished with all doors painted to match with painted doors, painted black for stainless steel doors.

2.04 EQUIPMENT: CAR COMPONENTS

- A. Cab
 Cab Options: Steel Shell Cab with stainless steel vertical removable panels

 Paints and laminate to be selected from manufacturer's catalog of choices.
 Brushed Stainless Steel finished base plate located at top and bottom
- B. Car Front Finish: Satin Stainless Steel.
- C. Car Door Finish: Satin Stainless Steel.
- D. Ceiling Type: Drop Ceiling LED Perimeter-lit ceiling w/ Brushed Steel Finish.
- E. Emergency Car Lighting: An emergency power unit employing a 6-volt sealed rechargeable battery and totally static circuits shall be provided to illuminate the elevator car in the event of building power failure.

- F. Fan: A one-speed 120 VAC fan will be mounted to the structural ceiling to facilitate in-car air circulation, meeting A17.1 code requirements. The fan shall be rubber mounted to prevent the transmission of structural vibration and will include a baffle to diffuse audible noise. A switch shall be provided in the car-operating panel to control the fan.
- G. Handrail: Handrails shall be provided on the side and rear walls of the car enclosure. Handrails shall be 1 ½" diameter (38.1 mm) Round bar handrail with a Brushed Steel
- H. Threshold: Nickel-Silver Finish.
- I. Emergency Exit Contact: An electrical contact shall be provided on the car-top exit.
- J. Guides: Car roller type guides at the top and the bottom.
- K. Platform: Car platform shall be constructed of metal.
- L. Certificate frame: Provide a Certificate frame with a satin stainless steel finish.
- M. The LED ceiling lights and the fan should automatically shut off when the system is not in use and be powered back up after a passenger calls the elevator and pushes a hall button.

2.05 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

- A. Car Operating Panel: A car operating panel shall be furnished. It shall contain a bank of round stainless steel, mechanical LED illuminated buttons. Flush mounted to the panel and marked to correspond to the landings served. All buttons to have raised numerals and Braille markings with:
 - 1. 1/8" (3mm) satin stainless steel projecting button with blue or white illuminating halo
- B. The car operating panel shall be equipped with the following features:
 - 1. Raised markings and Braille to the left hand side of each push-button.
 - 2. Car Position Indicator at the top of and integral to the car operating panel.
 - 3. Door open and door close buttons.
 - 4. Inspection key-switch.
 - 5. Elevator Data Plate marked with elevator capacity and car number.
 - 6. Help Button: The help button shall initiate two-way communication between the car and a location inside the building, switching over to another location if the call is unanswered, where personnel are available who can take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.
 - 7. Landing Passing Signal: A chime bell shall sound in the car to signal that the car is either stopping at or passing a floor served by the elevator.
 - 8. In car stop switch (toggle or key unless local code prohibits use)
 - 9. Firefighter's hat
 - 10. Firefighter's Phase II Key-switch
 - 11. Call Cancel Button

Optional

1. Firefighter's Phase II Emergency In-Car Operating Instructions: worded according to A17.1 2000, Article 2.27.7.2.

2. Please Exit Symbol: provided with emergency hospital service, Seismic Zones ≥ 2 or express priority in the hall.

- A. Car Position Indicator: A digital, LED car position indicator shall be integral to the car operating panel.
- B. Hall Fixtures: Hall fixtures shall be provided with necessary push buttons and key switches for elevator operation. Integral Hall fixtures shall feature round stainless steel, mechanical buttons marked to correspond to the landings. Hall fixtures to be located in the wall. Buttons shall be in vertically mounted fixture. Fixture shall be satin stainless steel.

Button Options: 1/8" (3mm) satin stainless steel projecting button with blue

- C. Car Lantern and Chime: A directional lantern visible from the corridor shall be provided in the car entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel and a chime will sound.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. Installation of all elevator components except as specifically provided for elsewhere by others.

3.03 DEMONSTRATION

- A. The elevator contractor shall make a final check of each elevator operation with the Owner or Owner's representative present prior to turning each elevator over for use. The elevator contractor shall determine that control systems and operating devices are functioning properly.

END OF SECTION

SECTION 21 00 00
FIRE SUPPRESSION SPRINKLER SYSTEM

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A.** Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SUMMARY

- A.** Provide fire suppression sprinkler systems. All piping shall be within walls and in heated areas. Wall mount third floor heads.
- B.** Coordinate with Owner's room uses to provide adequate system for all contract areas.
- C.** Coordinate location of fire protection systems to avoid interference with location of designated lighting fixture locations. Notify Architect prior to construction of areas with conflicts. If work proceeds without the Architects approval the work may need to be removed or reworked.
- D.** Preliminary meeting with architect required to coordinate the design of the system.
- E.** Site contractor shall extend pipe into building, turn up and cap.

1.03 SUBMITTALS

- F.** Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- G.** Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
- H.** Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, including operating instructions, list of spare parts and maintenance schedule.

1.03 QUALITY ASSURANCE

- A.** Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B.** Provide complete sprinkler coverage per NFPA 13R.

PART 2 PRODUCTS

2.01 MANUFACTURES

- A. Basis for Design Manufacturer: Zurn Industries LLC. 1801 Pittsburg Ave. Erie PA 16502, Tel: 814-455-0921 Fax: 814-875-1402, Web: www.zurn.com

2.02 MATERIALS

- A. Fire Suppression Systems:
1. Application: Sprinkler system.
 2. Sustainable Design: Optimize energy performance.
 3. Sustainable Design: Energy efficient equipment and fixtures.
 4. Sustainable Design: Commissioning.
- B. Type: Fire-suppression sprinkler systems.
1. Wet-pipe.
 2. Sprinkler heads and fittings.
- C. Components: Suitable for service.
1. Fixtures.
 2. Piping, fittings, and joints.
 3. Expansion fittings and loops.
 4. Sleeves and escutcheons.
 5. Flow and tamper alarm switches.
 6. Meters and gages.
 7. Gate valves, check valves, and drain valves.
 8. Pipe hangers and supports.
 9. Identification devices.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials in proper relation with adjacent construction and with uniform appearance for exposed work. Coordinate with work of other sections. Comply with applicable regulations and building code requirements.
- B. **Center ceiling-mounted elements in center of ceiling tiles as applicable and flush on ceiling drywall.**
- C. **Install all piping behind walls, ceilings, and above drop ceiling as to keep the system concealed.**
- D. Clearly label all valves and components.
- E. Restore damaged finishes. Test all systems for proper operation in accordance with NFPA 13, 14, and 20. Clean and protect work from damage.
- F. Instruct Owner's personnel in proper operation of systems.

END OF SECTION

SECTION 22 11 00

WATER SUPPLY SYSTEM

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the Instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All water supply piping, fitting and accessories required for a complete system as shown on the drawings and specified hereinafter.
- B. Some items of work (without limiting the generality of the word "extent") are as follows:
 - 1. The site Utility Contractor shall install the water service up to the building, install a building shut-off if required, bring the water into the building, install a building shut-off, with backflow preventer as required. Meter is in a pit outside.
 - 2. The plumbing water supply work shall start at the building shut-off for the domestic water system.
 - 3. Tests and adjustments.
 - 4. Excavation and backfill for all plumbing work.
 - 5. Chlorination of domestic water piping.
 - 6. Provide UL approved firestop system at all penetrations of fire rated assemblies as required. This work shall be reviewed in detail with the inspector at start of construction.
- C. This subcontractor is referred to Section 01 40 00, paragraph 1.06, "Trial Units". The General Contractor shall coordinate the construction of a trial unit of each type unit. This subcontractor shall order material and coordinate scheduling to provide complete rough-in and finish of one of each type unit to resolve any problems and coordination between plumbing, heating, electric, framing, etc. Once all problems have been resolved, all typical units shall be constructed the same for the entire project.

1.03 CODES, STANDARDS AND PERMITS

- A. All work under this section shall be in accordance with ASHA Standards, all state and local codes, and the following codes, standards and safety requirements.
 - 1. State Building and Plumbing Code, City and County Plumbing and Health Department Standards.
 - 2. Pressure Vessels and Pressure Piping.

3. All pressure equipment shall be ASME certified and stamped.
 4. ASTM.
 5. ASME.
 6. American Welding Society.
- B. When work is completed, this contractor shall furnish to the Architect a certificate of inspection and approval from the Department of Health before final payment of the contract will be allowed.
- C. The General Contractor shall obtain the General Trades building permit. The Plumbing Contractor shall obtain the plumbing permit and be responsible for all fees and inspections.

1.04 SUPERVISION OF WORK

- A. The contractor shall have in charge of the work, at all times during construction, a competent superintendent experienced in the work to be installed under this contract. This superintendent shall be a licensed plumber, if the City so requires.

1.05 QUALITY ASSURANCE

- A. Do not allow any work to be covered up or enclosed until inspected, tested and approved by authorities having jurisdiction over the work.
- B. Should any work be enclosed or covered up before such inspection or tests, Subcontractor shall, at his own expense, uncover the work, and after it has been inspected, tested, and approved, make all repairs as necessary to restore all work disturbed by him to its original and proper condition.
- C. All work specified herein shall be in accordance with rules, regulations, and requirements of any and all authorities having jurisdiction.
- D. Any and all requirements of this section, over and above such jurisdictional requirements shall be met.
- E. Furnish without charge any additional material and labor when and where required to comply with these rules and regulations, though the work is not mentioned in specifications or shown on drawings. When specifications or drawings call for or describe materials or construction of a better quality or larger sizes than required by the above mentioned rules and regulations, the provisions of these Specifications and accompanying drawings shall take precedence.
- F. Subcontractor shall coordinate the work of all trades involved or affected to avoid interferences.
- G. The plumbing work to be performed is shown on drawings and specified hereinafter. All work for complete installations or obviously necessary for the satisfactory operation of the systems, whether or not shown or hereinafter specified, shall be a part of this contract.

1.06 BASIC MATERIALS AND METHODS

- A. Plumbing drawings are diagrammatic and are intended to show the approximate locations of outlets, fixtures and piping. Dimensions given in figures on the drawings shall take precedence in the field.
- B. The exact locations of fixtures, apparatus, and outlets and piping shall be given as the plumbing work progresses, and this contractor shall ascertain such locations from the Architect and shall lay out his work accordingly. Should the contractor fail to ascertain such locations, the work shall be changed at his own expense when so ordered by the Architect. The Architect reserves the right to make minor changes in the location of piping and equipment up to the time of roughing in without additional cost.
- C. The drawings and specifications are intended to complement each other and any material or labor called for in one shall be furnished even though not specifically mentioned in both. Any material or labor of a minor nature which is neither shown on the drawings nor called for in the Specifications but which is obviously necessary to complete the work and which is usually included in the work of a similar character shall be furnished.
- D. This contractor shall provide all other contractors and trades proper information for all chases, sleeves, and other openings required to install the work, and shall be responsible for the accuracy of same. He shall be responsible for all cutting made necessary by any failure to provide such information.
- E. This contractor shall provide and set sleeves for all pipes passing through masonry construction. Sleeves shall be machine cut, standard weight, uncoated steel pipe except that brass or copper pipe sleeves shall be used for uninsulated pipes. Polyethylene "Crete Sleeves" may be used for all pipes in concrete construction. Sleeves shall be of size to allow for the pipe to pass through with a minimum annular clearance of 1/4". Sleeves passing through walls shall be cut flush with each surface unless otherwise specified. Center pipes passing through the sleeves by brazing brass spacers to the pipes. Caulk the annular space between the sleeves and pipes with oil free permanent plastic caulking compound. Unused sleeves shall be plugged and finished to match the adjacent surfaces. Sleeves in fire walls shall be sealed with compound that maintains fire rating of wall.
- F. Pipe shall be cut accurately to measurements established at the building, and shall be worked into place without springing or forcing, properly clearing all windows, doors, and other openings. All pipes shall have burrs removed by reaming and shall be so installed as to permit free expansion and contraction without damage to joints or hangers. All changes in direction shall be made with fittings. Provide UL approved firestop as required in fire rated assemblies.
- G. Piping connections to equipment shall be in accordance with details shown on the drawings, or as called for by the Specifications. All open ends of pipe lines or equipment shall be properly capped or plugged at all times during installation to keep dirt or other foreign material out of the system.
- H. All screw joints in piping shall be made tight with properly cut tapered threads. Screwed joints shall be made tight with Teflon pipe joint tape, graphite, cylinder oil paste, or Dixon's pipe compound properly installed or applied on the pipe threads. Screw fittings up close to shoulders of male threads. Do not use lampwick, cord, or any similar materials.

- I. Nipples shall be of the same weight and materials as the pipe with which they are used, except that all close and shoulder nipples shall be extra heavy.
- J. Water piping shall be run through stud walls sufficient distance from face of stud to prevent damage by drywall nails, etc. Any piping installed that is susceptible to damage shall be protected by steel plates installed on face of stud to prevent nail penetration. All protection work shall be by this subcontractor.

1.07 EXCAVATION AND BACKFILL

- A. This contractor shall perform all excavation of every description which is required to install the interior and exterior work to five feet (5') outside of the building. Excavation is required for water service, soil and drainage piping. The plumber shall attempt to hold trenches as narrow as possible when passing under the footings. In areas that have weakened the footings the trench shall be backfilled with 1, 2.5, 5 concrete mix to the level of the footing.
- B. Any cribbing and trench wall supporting which is required shall be included. Any pumping of surface water from the contractor's trenches which is required during construction shall be included in this contract.
- C. The width of pipe trenches for sanitary and storm sewers shall be held to a minimum and shall not exceed four feet (4') wide at the top of the pipe. Mechanical excavation in each shall be held to approximately four inches (4") above final invert grade. The remainder of the trench shall be shaped by manual excavation so that the bottom quadrant of the pipe shall be fully and uniformly supported. Bell holes shall be carefully excavated so that no part of the load is supported by the bells.
- D. Where the depth of trench warrants or where conditions endanger the safety of the workmen, sufficient sheeting and bracing shall be placed to prevent bank movement.
- E. All excavation under slabs shall be backfilled with washed pea gravel or approved equal. Suitable site material may be used, if approved by governing authorities, and providing it is properly compacted as listed in the Earthwork Section and required by the Supervising Soils Engineer. If the trench is to be backfilled with compacted site material, the area around, under and 6" above the pipe shall be backfilled with washed pea gravel. The remainder of the trench may then be filled with compacted site material.

1.08 CUTTING AND PATCHING

- A. All cutting of walls, floors, ceilings, etc. to permit the installation of the plumbing work is to be performed by the plumbing contractor.
- B. Avoid cutting of concrete, masonry, and other work by the use of inserts and sleeves. This contractor shall be responsible for the correct size and location of all inserts and sleeves, and shall be responsible for all cutting and patching required because of improper locations or sizes.
- C. If necessary to cut into the new work or another contractor, it shall be done by that contractor at this contractor's expense or by this contractor with the consent of the other contractor. Any patching made necessary by such cutting shall be executed in the same manner.

- D. The contractor shall not endanger any work by cutting or altering of any structural members. If cutting of structural member is contemplated, the contractor shall obtain permission from the Architect before work is begun. Cutting shall be done with such tools and methods as to prevent unnecessary damage to surrounding areas or equipment.
- E. Where holes or tapings are found to be necessary in any concrete, brick or tile work, such holes or tapings shall be made by rotary power drilling.

1.09 SUBMITTALS

- A. Immediately upon receipt of a contract this subcontractor shall submit shop drawings to the Architect for approval. Submittals shall include cut sheets and specifications for all piping valves, stops, insulation, hangers and miscellaneous items.

1.10 RECORD DRAWINGS

- A. During construction keep an accurate record of all deviations between the work as shown on the drawings and that which is actually installed.
- B. Secure from the Contractor a complete set of Plumbing drawings and note changes thereon. Make a complete record of changes and revisions in a neat and accurate manner in the original design which exist in the completed work.
- C. When all revisions showing the work as finally installed are made, the corrected drawings shall be submitted to the Contractor.

1.11 EQUIPMENT INGRESS AND HANDLING

- A. This contractor is solely responsible for purchasing his equipment and materials in such knocked down condition that it will pass through the building openings or such openings as may occur incidentally during the building construction.
- B. Equipment suppliers shall package all equipment that requires hoisting in such a manner that it may be hoisted without damage or distortion due to lack of reinforcement of stressed members.
- C. All equipment items shall be stored in a dry building or warehouse until such time that they are worked into the various systems. A covering of plastic sheet material shall not be considered sufficient protection for the equipment furnished under this contract.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All materials shall be new and shall comply with all applicable codes and standards.
- B. Plumbing Support Devices
 - 1. Pipe hangers and supports shall be as manufactured by Sioux Chief or approved equal.
 - 2. Water pipe hangers shall be black polyethylene "Padlock", "Tube Talon" or "Sioux Strap" as the situation may warrant. Universal brackets shall be "Pipe Titan" or "Grid Iron". For soldered connection at stub out use copper plated stub out bracket.

C. Water Supply Piping and Fitting

1. All above grade hot and cold water piping shall be CPVC.
2. All below grade piping shall be CPVC or as approved in OBC and OPC.
3. CPVC water piping shall be Flow Guard Gold as manufactured by Thompson, Charlotte, or approved equal. All fittings shall be by pipe manufacturer or approved by pipe manufacturer for use with their pipe. Transition from CPVC to copper or brass must be with CPVC "glue" fitting. CPVC may not be threaded to copper or brass.
4. Provide an isolation sleeve where piping penetrates concrete.
5. Provide steel plates as required to protect piping from possible nail penetrations.

D. Valves (Main Supply)

1. Valves shall be Watts, Milwaukee, Grinnell, Nibco, or approved equal. Valves shall be for 125 pound SWP working pressure.
2. All valves 2" and smaller shall be screwed type, with screwed adaptors used on all copper lines. Valves shall be globe valves. (1/4 turn)

E. Valves

1. Valves for CPVC piping shall be made with Flow Guard Gold by King Bros. Industries, or approved equal. Valves shall be 1/4 turn ball valves.
2. All accessory items (washer box, icemaker shutoff, valves and stops) shall be made with CPVC by King Bros. Industries, Oatey, or approved equal. Do not transition to copper or brass for accessory items.

F. Plumbing System Insulation

1. Cold water insulation shall be 1/2" thick Armstrong Armaflex 22. All seams shall be tape sealed.
2. Hot water insulation shall be 1" thick fibrous glass material by Owens Corning Fiberglas, Armstrong or John-Mansville. Insulation shall have a conductivity not exceeding 0.27 btuh per inch/h x ft² x °F (1.53W per 25mm/m² x K).

G. Hose Bibbs

1. Exterior wall hydrants shall be wheel operated, freeze proof, all brass by Mansfield; vacuum breaker type. Units shall be suitable for glued CPVC connection NOT a threaded or compression transition.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All items shall be installed in a first class workmanship manner. In general all piping shall be run within walls and chases, hidden from view. All work shall be in accordance with the standards set forth in all applicable codes (current editions). In fire rated locations follow UL fire stop test requirements.
- B. Hangers and supports
1. Install pipe hangers and supports for all piping equipment as required to adequately support the equipment. Hangers shall be located at changes in piping directions and concentrated loads. Hangers shall provide vertical adjustment to maintain pitch required for proper drainage.
 2. All hangers shall be installed in accordance with the manufacturer's recommendation. In general the maximum hanger spacing for steel piping and copper tubing shall be as follows:

<u>Size</u>	<u>Max. Hanger Spacing</u>		
	<u>Steel</u>	<u>Copper</u>	<u>CPVC</u>
Up to 1/2"	5'	5'	4'
3/4"	6'	5'	4 ½'
1"	7'	6'	5'
1-1/4"	9'	7'	5 ½'
1-1/2"	9'	8'	6'
2"	10'	8'	7'

The hanger spacings noted are the maximum permissible. Additional hangers shall be provided where shorter runs of piping, concentrated loads or equipment connections dictate additional support.

3. All PVC piping shall be supported at intervals of not more than four feet (4'). Pipe should also be supported at all branch ends and at all changes of direction. Support trap arms as close as possible to the trap. In keeping with good plumbing practices, support and brace all closet bends and fasten closet flanges.
- C. Water Supply Piping
1. Extend systems of hot and cold water piping to all items of equipment and fixtures requiring same and to other points as indicated on the drawings.
 2. Make proper connections to all fixtures, and other items of equipment provided under this contract, and to equipment provided under other contracts as hereinafter specified or shown on the drawings. See details and schedules on the drawings for pipe sizes and connections.

3. CPVC piping shall be installed in accordance with manufacturer's instructions using CPVC glue. All transitions to copper or other materials shall be made Transition Adapter fittings which allow a glued connection on the CPVC side. CPVC shall not be threaded to brass, copper or steel as a transition.

D. Hose Bibbs

1. Hose bibbs shall be installed in locations as shown on the drawings. All hose bibbs shall be installed with a shut off valve located in the line so that the line may be shut off and drained during cold weather.

E. Trap Primer

1. Install trap primers on all floor drains as required by code. Primers shall be installed in an accessible location. Review locations with Architect in field prior to installation.

F. Plumbing System Insulation

1. Install ½" thick Armaflex on all exposed water piping located in Mechanical Rooms and above the corridor ceiling. Seams are to be glued and taped using and following the manufacturer's recommendations and materials.
2. All circulating hot water lines and tap offs located above the corridor ceiling shall be insulated with 1" fiberglass insulation. Piping within walls does not need to be insulated.

3.02 TESTS OF PLUMBING

- A. Equipment, materials, power and labor necessary for inspection and tests shall be furnished by the contractor.
- B. All plumbing tests shall be done in accordance with local and state requirements.

3.03 ACCEPTANCE

- A. All work furnished under this section of the specification shall be thoroughly cleaned, ready for the use of the Owner.
- B. Upon completion of the entire systems covered by these Specifications, a certificate of approval from the different county departments having jurisdiction shall be obtained and then delivered to the Owner.

3.04 GUARANTEE

- A. The contractor shall guarantee and service all workmanship and materials to be as represented by him, and shall repair or replace, at no additional cost to the Owner, any part thereof which may be defective within the period of one (1) year after the date of final acceptance, ordinary wear and tear excepted.

3.05 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 22 13 00

SANITARY SYSTEM

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All domestic waste and vent piping, fittings and accessories required for a complete system as shown on the drawings and specified hereinafter.
- B. Some items of work (without restricting the generality of the word "extent") are as follows:
 - 1. Sanitary and waste system to 5' outside building. If the sanitary system up to the building has been installed, tested, and accepted prior to underslab installation, this contractor shall make the final connection to the lateral. If water lateral to building has been tested and accepted prior to rough-in, the Plumber shall make the final connection to water supply.
 - 2. Tests and adjustments.
 - 3. Excavation and backfill for all plumbing work.
 - 4. Provide UL approved firestop system at all penetrations of fire rated assemblies as required. This work shall be reviewed in detail with the inspector at start of construction.
- C. This subcontractor is referred to Section 01 40 00, paragraph 1.06, "Trial Units". The General Contractor shall coordinate the construction of a trial unit of each type unit. This subcontractor shall order material and coordinate scheduling to provide complete rough-in and finish of one of each type unit to resolve any problems and coordination between plumbing, heating, electric, framing, etc. Once all problems have been resolved, all typical units shall be constructed the same for the entire project.

1.03 RELATED SECTIONS

- A. Outside sanitary sewer run up to the cleanout is by the outside sewer contractor. The cleanout is by the plumber. If sewer system has not been accepted prior to underslab rough-in the site contractor shall make the final connection at the cleanout after City acceptance of system. Section 33 31 00

1.04 CODES, STANDARDS AND PERMITS

- A. All work under this section shall be in accordance with ASHA Standards, all state and local codes, and the following codes, standards and safety requirements.
 - 1. State Building and Plumbing Code, City and County Plumbing and Health Department Standards.
 - 2. Pressure Vessels and Pressure Piping.
 - 3. All pressure equipment shall be ASME certified and stamped.
 - 4. ASTM.
 - 5. ASME.
 - 6. American Welding Society.
- B. When work is completed, this contractor shall furnish to the Architect a certificate of inspection and approval from the Department of Health before final payment of the contract will be allowed.
- C. The General Contractor shall obtain the General Trades building permit. The Plumbing Contractor shall obtain the plumbing permit and be responsible for all fees and inspections.

1.05 SUPERVISION OF WORK

- A. The contractor shall have in charge of the work, at all times during construction, a competent superintendent experienced in the work to be installed under this contract. This superintendent shall be a licensed plumber, if the City so requires.

1.06 QUALITY ASSURANCE

- A. Do not allow any work to be covered up or enclosed until inspected, tested and approved by authorities having jurisdiction over the work.
- B. Should any work be enclosed or covered up before such inspection or tests, Subcontractor shall, at his own expense, uncover the work, and after it has been inspected, tested, and approved, make all repairs as necessary to restore all work disturbed by him to its original and proper condition.
- C. All work specified herein shall be in accordance with rules, regulations, and requirements of any and all authorities having jurisdiction.
- D. Any and all requirements of this section, over and above such jurisdictional requirements shall be met.

- E. Furnish without charge any additional material and labor when and where required to comply with these rules and regulations, though the work is not mentioned in specifications or shown on drawings. When specifications or drawings call for or describe materials or construction of a better quality or larger sizes than required by the above mentioned rules and regulations, the provisions of these Specifications and accompanying drawings shall take precedence.
- F. Subcontractor shall coordinate the work of all trades involved or affected to avoid interferences.
- G. The plumbing work to be performed is shown on drawings and specified hereinafter. All work for complete installations or obviously necessary for the satisfactory operation of the systems, whether or not shown or hereinafter specified, shall be a part of this contract.

1.07 BASIC MATERIALS AND METHODS

- A. Plumbing drawings are diagrammatic and are intended to show the approximate locations of outlets, fixtures and piping. Dimensions given in figures on the drawings shall take precedence in the field.
- B. The exact locations of fixtures, apparatus, and outlets and piping shall be given as the plumbing work progresses, and this contractor shall ascertain such locations from the Architect and shall lay out his work accordingly. Should the contractor fail to ascertain such locations, the work shall be changed at his own expense when so ordered by the Architect. The Architect reserves the right to make minor changes in the location of piping and equipment up to the time of roughing in without additional cost.
- C. The drawings and specifications are intended to complement each other and any material or labor called for in one shall be furnished even though not specifically mentioned in both. Any material or labor of a minor nature which is neither shown on the drawings nor called for in the Specifications but which is obviously necessary to complete the work and which is usually included in the work of a similar character shall be furnished.
- D. This contractor shall provide all other contractors and trades proper information for all chases, sleeves, and other openings required to install the work, and shall be responsible for the accuracy of same. He shall be responsible for all cutting made necessary by any failure to provide such information.
- E. This contractor shall provide and set sleeves for all pipes passing through masonry construction. Sleeves shall be machine cut, standard weight, uncoated steel pipe except that brass or copper pipe sleeves shall be used for uninsulated pipes. Polyethylene "Crete Sleeves" may be used for all pipes in concrete construction. Sleeves shall be of size to allow for the pipe to pass through with a minimum annular clearance of 1/4". Sleeves passing through walls shall be cut flush with each surface unless otherwise specified. Center pipes passing through the sleeves by brazing brass spacers to the pipes. Caulk the annular space between the sleeves and pipes with oil free permanent plastic caulking compound. Unused sleeves shall be plugged and finished to match the adjacent surfaces. Sleeves in fire walls shall be sealed with compound that maintains fire rating of wall.

- F. Pipe shall be cut accurately to measurements established at the building, and shall be worked into place without springing or forcing, properly clearing all windows, doors, and other openings. All pipes shall have burrs removed by reaming and shall be so installed as to permit free expansion and contraction without damage to joints or hangers. All changes in direction shall be made with fittings. Provide UL approved firestop as required in fire rated assemblies.
- G. Piping connections to equipment shall be in accordance with details shown on the drawings, or as called for by the Specifications. All open ends of pipe lines or equipment shall be properly capped or plugged at all times during installation to keep dirt or other foreign material out of the system.

1.08 EXCAVATION AND BACKFILL

- A. This contractor shall perform all excavation of every description which is required to install the interior and exterior work to five feet (5') outside of the building. Excavation is required for water service, soil and drainage piping. The plumber shall attempt to hold trenches as narrow as possible when passing under the footings. In areas that have weakened the footings the trench shall be backfilled with 1, 2.5, 5 concrete mix to the level of the footing.
- B. Any cribbing and trench wall supporting which is required shall be included. Any pumping of surface water from the contractor's trenches which is required during construction shall be included in this contract.
- C. The width of pipe trenches for sanitary and storm sewers shall be held to a minimum and shall not exceed four feet (4') wide at the top of the pipe. Mechanical excavation in each shall be held to approximately four inches (4") above final invert grade. The remainder of the trench shall be shaped by manual excavation so that the bottom quadrant of the pipe shall be fully and uniformly supported. Bell holes shall be carefully excavated so that no part of the load is supported by the bells.
- D. Where the depth of trench warrants or where conditions endanger the safety of the workmen, sufficient sheeting and bracing shall be placed to prevent bank movement.
- E. All excavation under slabs shall be backfilled with washed pea gravel or approved equal. Suitable site material may be used, if approved by governing authorities, and providing it is properly compacted as listed in the Earthwork Section and required by the Supervising Soils Engineer. If the trench is to be backfilled with compacted site material, the area around, under and 6" above the pipe shall be backfilled with washed pea gravel. The remainder of the trench may then be filled with compacted site material.

1.09 CUTTING AND PATCHING

- A. All cutting of walls, floors, ceilings, etc. to permit the installation of the plumbing work is to be performed by the plumbing contractor.
- B. Avoid cutting of concrete, masonry, and other work by the use of inserts and sleeves. This contractor shall be responsible for the correct size and location of all inserts and sleeves, and shall be responsible for all cutting and patching required because of improper locations or sizes.

- C. If necessary to cut into the new work or another contractor, it shall be done by that contractor at this contractor's expense or by this contractor with the consent of the other contractor. Any patching made necessary by such cutting shall be executed in the same manner.
- D. The contractor shall not endanger any work by cutting or altering of any structural members. If cutting of structural member is contemplated, the contractor shall obtain permission from the Architect before work is begun. Cutting shall be done with such tools and methods as to prevent unnecessary damage to surrounding areas or equipment.
- E. Where holes or tapings are found to be necessary in any concrete, brick or tile work, such holes or tapings shall be made by rotary power drilling.

1.10 SUBMITTALS

- A. Immediately upon receipt of a contract this subcontractor shall submit shop drawings to the Architect for approval. Submittals shall include cut sheets and specifications for all fixtures, valves, stops, hot water heater, insulation, hangers and miscellaneous items.
- B. Fixtures shall be submitted in a brochure showing by illustrations, catalog number and description all detail requirements. Incomplete submittals are not acceptable.

1.11 RECORD DRAWINGS

- A. During construction keep an accurate record of all deviations between the work as shown on the drawings and that which is actually installed.
- B. Secure from the Contractor a complete set of Plumbing drawings and note changes thereon. Make a complete record of changes and revisions in a neat and accurate manner in the original design which exist in the completed work.
- C. When all revisions showing the work as finally installed are made, the corrected drawings shall be submitted to the Contractor.

1.12 EQUIPMENT INGRESS AND HANDLING

- A. This contractor is solely responsible for purchasing his equipment and materials in such knocked down condition that it will pass through the building openings or such openings as may occur incidentally during the building construction.
- B. Equipment suppliers shall package all equipment that requires hoisting in such a manner that it may be hoisted without damage or distortion due to lack of reinforcement of stressed members.
- C. All equipment items shall be stored in a dry building or warehouse until such time that they are worked into the various systems. A covering of plastic sheet material shall not be considered sufficient protection for the equipment furnished under this contract.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All materials shall be new and shall comply with all applicable codes and standards.
- B. Plumbing Support Devices
 - 1. DWV hangers shall be "Zipstick" universal nylon hanger or "Hang Tuff".
- C. Soil, Waste and Vent Piping and Accessories
 - 1. Soil, waste and vent lines shall be PVC (polyvinylchloride) schedule 40 conforming to the requirements of ASTM D-2665.
 - 2. Solvent shall be PVC type.
 - 3. Cleanouts in exposed piping in mechanical rooms, etc., piping above the hung ceiling, or behind access panels shall be PVC threaded cleanouts.
 - 4. Cleanouts in drywall not behind access panels may be PVC threaded cleanouts with a nickel bronze or aluminum smooth access cover (approximately 8" dia.) with counter-sunk screw to match. The hex head on the PVC cleanout shall be drilled and tapped to hold the access and cover screw. These should be painted by the painting contractor before installation. (Paint to match walls.) Cover shall be similar to Josam Series 58600.
 - 5. Cleanouts in the floor shall be similar to Josam Series 56000. Unit shall be Leveze Kleenatron with satin finish nikaloy top, adjustable cast iron body and ABS plug. Exterior cleanouts in concrete stoops shall be cast brass flush with slab.
 - 6. Floor drains in public areas shall have a 6" strainer diameter, stain nikaloy strainer and PVC body.
 - 7. Trap Primers: Trap primers shall conform to ASSE Standard 1044. Furnish trap primers as required. Trap primers shall be selected by number of drains required.
 - a. Precision Plumbing Products, Wade, Zurn, Josam or J. R. Smith.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All items shall be installed in a first class workmanship manner. In general all piping shall be run within walls and chases, hidden from view. All work shall be in accordance with the standards set forth in all applicable codes (current editions). In fire rated locations follow UL fire stop test requirements.

B. Hangers and supports

1. Install pipe hangers and supports for all piping equipment as required to adequately support the equipment. Hangers shall be located at changes in piping directions and concentrated loads. Hangers shall provide vertical adjustment to maintain pitch required for proper drainage.
2. All PVC piping shall be supported at intervals of not more than four feet (4'). Pipe should also be supported at all branch ends and at all changes of direction. Support trap arms as close as possible to the trap. In keeping with good plumbing practices, support and brace all closet bends and fasten closet flanges.

C. Soil, Waste and Vent Piping

1. Extend a complete system of sanitary drains, soil and waste piping, vents and vent stacks and branches in the building to serve all fixtures.
2. All piping shall be installed in accordance with the manufacturer's recommendations. Solvent shall be applied to dry piping only.
3. Cleanout shall be located as shown on the drawings and required by applicable plumbing codes. Cleanouts in floors shall be adjusted to meet finish flooring.
4. Flash vents through the roof with pre-manufactured units in accordance with roof manufacturer's requirements.
5. UL fire stop all penetrations thru fire rated construction as required.

D. Arrangement of Pipe and Equipment

1. All pipe, valves, and equipment shall be physically arranged and placed to be accessible and easily serviced.

3.02 TESTS OF PLUMBING

- A. Equipment, materials, power and labor necessary for inspection and tests shall be furnished by the contractor.
- B. All plumbing tests shall be done in accordance with local and state requirements.

3.03 ACCEPTANCE

- A. All work furnished under this section of the specification shall be thoroughly cleaned, ready for the use of the Owner.
- B. Upon completion of the entire systems covered by these Specifications, a certificate of approval from the different county departments having jurisdiction shall be obtained and then delivered to the Owner.

3.04 GUARANTEE

- A. The contractor shall guarantee and service all workmanship and materials to be as represented by him, and shall repair or replace, at no additional cost to the Owner, any part thereof which may be defective within the period of one (1) year after the date of final acceptance, ordinary wear and tear excepted.

3.05 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 22 34 00

DOMESTIC WATER HEATER

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SELECTION INCLUDES

- A. All labor, materials, equipment and services for all water heater work as shown on the drawings and hereinafter specified.
- B. This subcontractor is referred to Division 1, "Trial Units". The General Contractor shall coordinate the construction of a trial unit of each type unit. This subcontractor shall order material and coordinate scheduling to provide complete rough-in and finish of one of each type unit to resolve any problems and coordination between plumbing, heating.

1.03 RELATED SECTIONS

- A. Water piping: Section 22 11 00
- B. Floor drain: Section 22 13 00

1.04 CODES, STANDARDS AND PERMITS

- A. All work under this section shall be in accordance with ASHA Standards, all state and local codes, and the following codes, standards and safety requirements.
 - 1. State Building and Plumbing Code, City and County Plumbing and Health Department Standards.
 - 2. Pressure Vessels and Pressure Piping.
 - 3. All pressure equipment shall be ASME certified and stamped.
 - 4. ASTM.
 - 5. ASME.
- B. When work is completed, this contractor shall furnish to the Architect a certificate of inspection and approval from the Department of Health before final payment of the contract will be allowed.
- C. The General Contractor shall obtain the General Trades building permit. The Plumbing Contractor shall obtain the plumbing permit and be responsible for all fees and inspections.

1.05 SUPERVISION OF WORK

- A. The contractor shall have in charge of the work, at all times during construction, a competent superintendent experienced in the work to be installed under this contract. This superintendent shall be a licensed plumber, if the City so requires.

1.06 SUBMITTALS

- A. Immediately upon receipt of a contract this contractor shall submit shop drawings and cut sheets for all equipment and accessories.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Hot Water Heaters
 - 1. Hot water heating equipment shall be as manufactured by A. O. Smith, with approved equals by National, State, Rheem, or Locknivar. Units shall be model numbers as shown on the drawings. Provide drain pan for all units. (Submit for approval prior to ordering.)
 - 2. All heaters shall be provided with ASME approved lever operated pressure and temperature relief valve of proper size, having a minimum capacity of the BTU/HR input of the heater.
 - 3. Entire unit and accessories shall be pre-wired and factory tested complete with UL approval, magnesium rod, 150 psi construction, immersion thermostat, high limit control, magnetic contactors, drain valve, and insulated metal jacket.
 - 4. Provide circulating pumps, thermostatic mixing valves, backflow preventer, expansion tank, etc. as shown and required for a complete installation.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All items shall be installed in a first class workmanship manner. In general all piping shall be run within walls and chases, hidden from view.
- B. Water Heater
 - 1. Entire heating unit and accessories shall be installed in accordance with manufacturer's instructions and general good practice. Care shall be taken that heater is delivered before the building is closed in, if this will present an installation problem after the building is closed in.

2. Water heaters shall be connected with di-electric unions, if needed; if not needed, copper shall be used. Provide a 12" section of copper piping connected to the tank then transition to CPVC.
3. Install pans under all heaters and pipe pan to first floor drain.

3.02 TESTS OF PLUMBING

- A. Water heaters and piping shall be tested in accordance with state and local requirements.

3.03 ACCEPTANCE

- A. Upon completion of the entire system a certificate of approval from the different county departments having jurisdiction shall be obtained and then delivered to the owner.

3.04 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 22 41 00

PLUMBING FIXTURES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, labor, equipment, and services for all plumbing fixture work as shown on the drawings and hereinafter specified.

1.03 RELATED SECTIONS

- A. Water piping: Section 22 11 00
- B. Drains and vents: Section 22 13 00

1.04 CODES, STANDARDS AND PERMITS

- A. All work under this section shall be in accordance with ASHA Standards, all state and local codes, and the following codes, standards and safety requirements.
 - 1. State Building and Plumbing Code, City and County Plumbing and Health Department Standards.
 - 2. ASTM.
 - 3. ASME.
- B. When work is completed, this contractor shall furnish to the Architect a certificate of inspection and approval from the Department of Health before final payment of the contract will be allowed.
- C. The General Contractor shall obtain the General Trades building permit. The Plumbing Contractor shall obtain the plumbing permit and be responsible for all fees and inspections.

1.05 SUPERVISION OF WORK

- A. The contractor shall have in charge of the work, at all times during construction, a competent superintendent experienced in the work to be installed under this contract. This superintendent shall be a licensed plumber, if the City so requires.

1.06 SUBMITTALS

- A. Immediately upon receipt of a contract this subcontractor shall submit shop drawings and cut sheets for all equipment and accessories.
- B. Fixtures shall be submitted in a brochure showing by illustrations, catalog number and description of all requirements. Incomplete submittals are not acceptable.

1.07 EQUIPMENT INGRESS AND HANDLING

- A. This contractor is solely responsible for purchasing his equipment and materials in such knocked down condition that it will pass through the building openings or such openings as may occur incidentally during the building construction.
- B. Equipment suppliers shall package all equipment that requires hoisting in such a manner that it may be hoisted without damage or distortion due to lack of reinforcement of stressed members.
- C. All equipment items shall be stored in a dry building or warehouse until such time that they are worked into the various systems. A covering of plastic sheet material shall not be considered sufficient protection for the equipment furnished under this contract.

PART 2 PRODUCTS

2.01 PLUMBING FIXTURES AND TRIM

- A. All plumbing fixtures and trim shall be model numbers as listed on the drawings.
- B. Urinals, water closets, tubs and lavatories are by Sterling and American Standard with equals by Eljer, Crane, Briggs, Mansfield, and Kohler.
- C. Faucets are by Cleveland and Moen with equals by Delta, American Standard, Price Pfister.
- D. Water closet seats are by Bemis with equals by Beneke or Olsonite.
- E. Miscellaneous traps, stops, etc. are by Dearborn. (Provide ¼ turn).
- F. Stainless steel sinks are by Dayton, Just or Sterling.
- G. Disposals are by Insinkerator or General Electric.
- H. Locations and setting of all plumbing fixtures shall be taken from Architect's drawings. Contractor shall install plumbing fixtures from shop drawings as approved.
- I. Protection of plumbing fixture: Contractor shall protect all plumbing fixtures during construction. After plumbing fixtures have been set in place and final connections have been made, this contractor shall clean all fixtures and trim ready for use. Fixtures and trim damaged during installation shall be replaced at no cost to the Owner. All bathtubs shall be protected with tub protectors. Protectors shall be left in place until after drywall and tubwall work is completed.
- J. Individual unit water meters shall be supplied by the general contractor for installation by the plumber.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All items shall be installed in a first class workmanship manner. All fixtures shall be installed in accordance with instructions.
- B. Provide ¼ turn stops on all faucets with flexible threaded supply hoses, sized as required.
- C. All kitchen sinks shall be set in a continuous bed of plumber's putty.

3.02 TESTS OF PLUMBING

- A. Equipment, materials, power and labor necessary for inspection and tests shall be furnished by the contractor.
- B. All plumbing tests shall be done in accordance with local and state requirements.

3.03 ACCEPTANCE

- A. All work furnished under this section of the specification shall be thoroughly cleaned, ready for the use of the Owner.
- B. Upon completion of the entire systems covered by these Specifications, a certificate of approval from the different county departments having jurisdiction shall be obtained and then delivered to the Owner.

3.04 GUARANTEE

- A. The contractor shall guarantee and service all workmanship and materials to be as represented by him, and shall repair or replace, at no additional cost to the Owner, any part thereof which may be defective within the period of one (1) year after the date of final acceptance, ordinary wear and tear excepted.

3.05 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 23 31 00

DUCTWORK

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment, and services for all ductwork shown on the drawings and specified hereinafter.
- B. The general contractor shall obtain the general trades permit. The HVAC contractor shall obtain all permits for the HVAC work and be responsible for all fees and inspections.
- C. Some items of work, without limiting the generality of the word "extent" are as follows:
 - 1. Sheet metal ducts.
 - 2. Insulated ductwork.
 - 3. Firestop all penetrations as required using UL approved firestop system applicable to the installation.
- D. This subcontractor is referred to Section 01 40 00, paragraph 1.06, "Trial Units". The General Contractor shall coordinate the construction of a trial unit of each type unit. This subcontractor shall order material and coordinate scheduling to provide complete rough-in and finish of one of each type unit to resolve any problems and coordination between plumbing, heating, electric, framing, etc. Once all problems have been resolved, all typical units shall be constructed the same for the entire project.
- E. This contractor's work shall also include cleaning, testing, balancing, and adjusting the heating and air conditioning systems for proper heating and air distribution to all areas. He shall completely and fully balance all air supply systems to the quantity indicated on the drawings and, in addition, he shall balance these systems to maintain uniform temperatures throughout each space.
- F. It is the intent that the work shall be complete in every respect and that any materials specifically not mentioned or shown on the drawings, but necessary to fully complete the work, shall be furnished.

- G. It is the intent of the Drawings and Specifications to provide for the installation of a heating system which is safe, quiet, and economical in operation, and complete in all respects and which will provide a uniform temperature of 72 degrees in all living spaces and temperatures in other spaces as may be noted on the drawings, when outside temperature is at the outside design temperature established by ASHRAE for the locality. All materials and equipment necessary to accomplish the intent shall be furnished and installed by the contractor.

1.03 RELATED SECTIONS

- A. Diffusers & registers: Section 23 37 00
- B. HVAC equipment: Section 23 70 00
- C. Fans: Section 23 34 00

1.04 GENERAL REQUIREMENTS

- A. The drawings accompanying these specifications are complimentary to them; whatever is called for by one shall be considered as called for by both unless specifically stated or shown otherwise.
- B. All material and equipment installed under this contract shall be new, undeteriorated, and of a quality not less than the minimum specified herein. All items shall be UL and AGA or equivalent.
- C. All workmanship shall be in accordance with the best practices of the trade.
- D. The duct and piping layout shown on the drawings is schematic; its exact location shall be determined on the job by structural and other conditions. This is not to be construed to mean the design of the system may be changed; it refers only to the exact locations of piping and equipment to fit into the building as construction and the coordination of piping and equipment with the piping and equipment included under other divisions of the Specifications and other trades.
- E. Furnish and install all necessary hangers, supports, straps, and fittings not indicated on the drawings but which are required for a complete and properly installed system with the architectural treatment of the building.
- F. Consult all contractor drawings which may affect the location of piping and equipment and make minor adjustments in location to secure coordination. Other than minor adjustment shall be submitted to the Architect for approval before proceeding with the work.
- G. If units are used during construction, approval must be obtained in writing from the Architect and Owner prior to start up. No units may be used before this written approval is obtained. If units are used during construction, it shall be based on the following conditions:
 - 1. The warranty period shall not begin until turnover to the Owner. At the date of final acceptance by the Owner the units shall be guaranteed for a period of one (1) year.
 - 2. Drywall work must be completed with floor swept and prime coat of paint complete prior to unit start-up.

1.05 CODES, PERMITS AND CERTIFICATES

- A. Materials and workmanship entering into the entire installation shall be in full accordance with all rules and regulations of all state, county, and city authorities having jurisdiction over the premises. This shall include all safety requirements of the National Board of Fire Underwriters as interpreted by the Local Inspection Division. This contractor shall secure and pay all fees required.
- B. The contractor shall not be relieved from compliance with any requirements of the Specifications which are in excess of code requirements and not in conflict therewith.
- C. When work is completed this contractor shall furnish to the Architect, in duplicate, any certificate of inspection that may be required before final payment of this contract will be allowed.

1.06 SUBMITTALS

- A. Immediately upon receipt of a contract, this subcontractor shall prepare shop drawings for submission to the Architect for approval. Submittals shall include the following:
 - 1. Sheet metal ductwork & fittings
 - 2. Insulated ductwork

1.07 GUARANTEE

- A. All work under this contract shall be guaranteed against defects in material and workmanship for a period of one (1) year from the date of final acceptance. Should any defects develop within this period, this contractor shall repair them and all damage that might result from same at no expense to the Owner.

1.08 EQUIPMENT INGRESS AND HANDLING

- A. This contractor is solely responsible for purchasing his equipment and materials in such knocked down condition that they will pass through the building openings as may occur incidentally during the building construction.
- B. Equipment suppliers shall package all equipment that requires hoisting in such a manner that it may be hoisted without damage or distortion due to lack of reinforcement of the stressed members.
- C. All equipment items including fans, pumps, control assemblies, electric motors, and air conditioning units shall be stored in a dry building or warehouse until such time they are worked into the various systems. A covering of plastic sheet material shall not be considered sufficient protection.

1.09 CUTTING AND PATCHING

- A. Avoid cutting of concrete, masonry, and other work by use of inserts and sleeves, and when necessary this shall be done by the heating contractor with such tools and methods as to prevent unnecessary damage to surrounding areas and equipment.
- B. No cutting shall be done which will in any way reduce the structural strength of the building. Should such cutting be found necessary, the Architect must first be fully informed and consent to the proposed operation.
- C. Patching shall match existing surfaces in kind and finish and shall be done by the General Contractor at the heating contractor's expense. (See General Conditions.)

1.10 BASIC MATERIALS AND METHODS

- A. The contractor shall provide for all other contractors and trades proper information for all chases, sleeves, and other openings required to install the work and shall be responsible for all cutting made necessary by any failure to provide such information.
- B. Before installing any of his work, the contractor shall be governed by the work of other trades and all structural and architectural requirements.
- C. All pipes shall be concealed in pipe spaces, vent spaces, or chases where possible. All piping exposed to view shall be installed in a neat and workmanlike manner.

1.11 RECORD DRAWINGS

- A. During construction keep an accurate record of all deviations between the work as shown on the drawings and that which is actually installed.
- B. Secure from the contractor a complete set of Mechanical Drawings and note changes thereon. Make a complete record of all changes and revisions in a neat and accurate manner.
- C. When all revisions showing the work as finally installed are made, the corrected drawings shall be submitted to the contractor.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Sheet Metal Ductwork
 - 1. Furnish and install ductwork indicated on the drawings as required for the heating, ventilating and exhaust systems of the building.
 - 2. All ductwork shall be constructed and erected according to the recommendations of the latest ASHRAE Guide and Data Book. Reinforce all ducts to prevent buckling, breathing, vibrations, or unnecessary noise.
 - 3. All supply, return, exhaust and outside air ductwork shall be conventional low pressure ducts.
 - 4. Low pressure ducts shall be constructed of galvanized iron of the following weight:

Longest Dimensions	U. S. Gauge
0" to 12"	26
13" to 30"	24
55" to 84"	20

Round ducts shall be as follows:

0" to 8"	30
8" to 12" dia.	26
13" to 18" dia.	24

5. Sheet metal ducts shall be braced and reinforced with galvanized steel angles, or other structural members. Horizontal ducts shall be supported with band iron hanger attached to the construction above. All ducts shall be sealed.
6. Flexible connections where shown on the plans shall have at least 3" of flexible material between the metal parts being isolated and shall be installed in no less than one inch (1") of stack flexible material. Flexible material shall be neoprene coated fiberglass cloth.

B. Insulated Ductwork

1. Insulated ductwork shall be sheet metal ductwork as listed above insulated on the outside with duct wrap. Branch runs may be insulated flexible duct (only if hung straight and true without unnecessary bends). Insulation shall meet current code requirement. All insulation shall be secured tightly with all joints taped and sealed to prevent air leakage.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All workmanship shall be in accordance with general good workmanship practices and applicable codes, and SMACNA Standards.
- B. All ductwork shall be run true and level with band hangers. All joints shall be screw attached or cleated and then taped to prevent air leakage. The entire system shall be installed to eliminate any unnecessary friction loss with the ductwork.
- C. All roof penetrations shall be flashed by this subcontractor and then sealed by the roofing subcontractor. All work shall be in accordance with the roofing manufacturer's warranty requirements.

3.02 FIRESTOPPING

- A. All ductwork, piping, materials and equipment passing through draftstopping and all fire rated floors or walls shall have complete perimeter sealed by a fire resistant material equal to fire rating of the structure. Material shall be installed per U/L fire test.

3.03 TESTS AND ADJUSTMENTS

- A. The refrigerant piping shall be tested to not less than 150 pounds pressure before it is concealed or covered. After the piping has been tested and proven tight, it shall be thoroughly evacuated and charged with freon gas and flame tested. This contractor shall guarantee tightness of the freon system. He shall furnish all freon required during the first year of operation. The entire installation and piping shall be in compliance with all codes, laws, and ordinances. Any certificates of inspection that may be required shall be secured and submitted to the Architect before final payment of this contract will be made.
- B. The heating, air conditioning and ventilating system shall be put into operation and all mechanical adjustments to the equipment shall be made to insure proper functioning of same. Drivers are to be adjusted to run at proper speeds to deliver the amount of air required and to insure that the motors are of ample size to run full load in continuous service without overheating. Volume dampers shall be set and locked in position to insure that air flow into each area is properly adjusted and equalized. The system and all controls shall be completely tested and adjusted so that each outlet delivers its proper quantity of air. Air quantities shall be measured with an air meter and they shall be rechecked after the final adjustments are made.

3.04 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property, and leave all floors broom clean in all areas affected by his work. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 23 34 00

FANS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment, and services for all fan work as shown on the drawings and specified hereinafter.
- B. This subcontractor is referred to Section 01 40 00, paragraph 1.06, "Trial Units". The General Contractor shall coordinate the construction of a trial unit of each type unit. This subcontractor shall order material and coordinate scheduling to provide complete rough-in and finish of one of each type unit to resolve any problems and coordination between plumbing, heating, electric, framing, etc. Once all problems have been resolved, all typical units shall be constructed the same for the entire project.
- C. It is the intent that the work shall be complete in every respect and that any materials specifically not mentioned or shown on the drawings, but necessary to fully complete the work, shall be furnished.

1.03 RELATED SECTIONS

- A. Ductwork: Section 23 31 00
- B. Electrical: Division 26

1.04 GENERAL REQUIREMENTS

- A. The drawings accompanying these specifications are complimentary to them; whatever is called for by one shall be considered as called for by both unless specifically stated or shown otherwise.
- B. All material and equipment installed under this contract shall be new, undeteriorated, and of a quality not less than the minimum specified herein. All items shall be UL and AGA or equivalent.
- C. All workmanship shall be in accordance with the best practices of the trade.
- D. Furnish and install all necessary hangers, supports, straps, and fittings not indicated on the drawings but which are required for a complete and properly installed system with the architectural treatment of the building.

- E. Consult all contractor drawings which may affect the location of piping and equipment and make minor adjustments in location to secure coordination. Other than minor adjustment shall be submitted to the Architect for approval before proceeding with the work.

1.05 CODES, PERMITS AND CERTIFICATES

- A. Materials and workmanship entering into the entire installation shall be in full accordance with all rules and regulations of all state, county, and city authorities having jurisdiction over the premises. This shall include all safety requirements of the National Board of Fire Underwriters as interpreted by the Local Inspection Division. This contractor shall secure and pay all fees required.
- B. The contractor shall not be relieved from compliance with any requirements of the Specifications which are in excess of code requirements and not in conflict therewith.
- C. When work is completed this contractor shall furnish to the Architect, in duplicate, any certificate of inspection that may be required before final payment of this contract will be allowed.

1.06 SUBMITTALS

- A. Immediately upon receipt of a contract, this subcontractor shall prepare shop drawings for submission to the Architect for approval. Submittals shall include the following:
 - 1. Exhaust fans.

1.07 GUARANTEE

- A. All work under this contract shall be guaranteed against defects in material and workmanship for a period of one (1) year from the date of final acceptance. Should any defects develop within this period, this contractor shall repair them and all damage that might result from same at no expense to the Owner.

1.08 OPERATING AND SERVICE INSTRUCTIONS

- A. This contractor shall place all systems in operating condition and shall instruct the Owner and his representatives in the operation of the system. After completion of instructions, this contractor shall provide the Owner with a binder on all the equipment. Binder shall include equipment cut sheets, wiring diagrams, servicing instructions, parts books, parts supply houses and servicing and maintenance companies that are familiar with the equipment supplied.

1.09 EQUIPMENT INGRESS AND HANDLING

- A. All equipment items including fans, pumps, control assemblies, electric motors, and air conditioning units shall be stored in a dry building or warehouse until such time they are worked into the various systems. A covering of plastic sheet material shall not be considered sufficient protection.

PART 2 PRODUCTS

2.01 MATERIALS

A. Exhaust Fans

1. Exhaust fans shall be model numbers on the drawings. Drawings are based on models by Broan with equals by Fasco, Aubrey or Nutone.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All workmanship shall be in accordance with general good workmanship practices and applicable codes, and SMACNA Standards.
- B. All fans shall be anchored to floor or roof trusses with manufacturer's mounting bars. Fans shall be installed so there is no vibration. If necessary mount fans to solid blocking between trusses to insure a sound mounting.

3.02 FIRESTOPPING

- A. Install firestopping as needed. Fire caulk the fan housing at the ceiling penetration if required.

3.04 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property, and leave all floors broom clean in all areas affected by his work. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 23 37 00

DIFFUSERS, REGISTERS, GRILLES & FIRE DAMPERS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. Provide all labor, materials, equipment, and services for all diffusers, fire damper and register work as shown on the drawings and specified hereinafter.
- B. It is the intent that the work shall be complete in every respect and that any materials specifically not mentioned or shown on the drawings, but necessary to fully complete the work, shall be furnished.
- C. It is the intent of the Drawings and Specifications to provide for the installation of a heating system which is safe, quiet, and economical in operation, and complete in all respects and which will provide a uniform temperature of 72 degrees in all living spaces and temperatures in other spaces as may be noted on the drawings, when outside temperature is at the outside design temperature established by ASHRAE for the locality. All materials and equipment necessary to accomplish the intent shall be furnished and installed by the contractor.

1.03 RELATED SECTIONS

- A. Ductwork: Section 23 31 00

1.04 GENERAL REQUIREMENTS

- A. The drawings accompanying these specifications are complimentary to them; whatever is called for by one shall be considered as called for by both unless specifically stated or shown otherwise.
- B. All material and equipment installed under this contract shall be new, undeteriorated, and of a quality not less than the minimum specified herein. All items shall be UL and AGA or equivalent.
- C. All workmanship shall be in accordance with the best practices of the trade.

1.05 CODES, PERMITS AND CERTIFICATES

- A. Materials and workmanship entering into the entire installation shall be in full accordance with all rules and regulations of all state, county, and city authorities having jurisdiction over the premises. This shall include all safety requirements of the National Board of Fire Underwriters as interpreted by the Local Inspection Division. This contractor shall secure and pay all fees required.

DIFFUSERS, REGISTERS, GRILLES & FIRE DAMPERS

23 37 00-1

- B. The contractor shall not be relieved from compliance with any requirements of the Specifications which are in excess of code requirements and not in conflict therewith.
- C. When work is completed this contractor shall furnish to the Architect, in duplicate, any certificate of inspection that may be required before final payment of this contract will be allowed.

1.06 SUBMITTALS

- A. Immediately upon receipt of a contract, this subcontractor shall prepare shop drawings and cut sheets for submission to the Architect for approval. Submission shall be for registers, grilles and radiant fire dampers.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Registers and Grilles
 - 1. Registers shall be multiple louver sidewall, ceiling or baseboard with vertical bars and horizontal opposed blade dampers, size and capacities as shown on the drawings. Units by Lima, U. S. Register or Hartley-Cooley may be furnished. Model numbers on drawings are based on Lima.
- B. Fire Dampers
 - 1. Provide radiant fire dampers in all fire rated ceilings as shown on drawings. Dampers by Greenheck or approved equal. Review with Inspector during rough-in. Provide a fire damper at the fire rated ceiling penetration of the supply air plenum. All dampers shall be UL listed for the applicable installation.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Radiant fire damper work shall be in accordance with code requirements and the applicable U/L test and approval data.
- B. Register shall be installed flush with ceiling or wall materials. Use prefinished screws provided with the registers.

3.02 FIRESTOPPING

- A. All ductwork, piping, materials and equipment passing through draftstopping and all fire rated floors or walls shall have complete perimeter sealed by a fire resistant material equal to fire rating of the structure. Material shall be installed per U/L fire test.

3.03 TESTS AND ADJUSTMENTS

- A. The refrigerant piping shall be tested to not less than 150 pounds pressure before it is concealed or covered. After the piping has been tested and proven tight, it shall be thoroughly evacuated and charged with freon gas and flame tested. This contractor shall guarantee tightness of the freon system. He shall furnish all freon required during the first year of operation. The entire installation and piping shall be in compliance with all codes, laws, and ordinances. Any certificates of inspection that may be required shall be secured and submitted to the Architect before final payment of this contract will be made.
- B. The heating, air conditioning and ventilating system shall be put into operation and all mechanical adjustments to the equipment shall be made to insure proper functioning of same. Drivers are to be adjusted to run at proper speeds to deliver the amount of air required and to insure that the motors are of ample size to run full load in continuous service without overheating. Volume dampers shall be set and locked in position to insure that air flow into each area is properly adjusted and equalized. The system and all controls shall be completely tested and adjusted so that each outlet delivers its proper quantity of air. Air quantities shall be measured with an air meter and they shall be rechecked after the final adjustments are made.

3.04 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property, and leave all floors broom clean in all areas affected by his work. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 23 70 00

HVAC EQUIPMENT

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment, and services necessary to complete all heating, ventilating and air conditioning systems as shown on the drawings and specified hereinafter. The General Contractor shall obtain the General Trades building permit. The Heating Contractor shall obtain the heating permit and be responsible for all fees and inspections.
- B. Some items of work, without limiting the generality of the word "extent" are as follows:
 - 1. Forced air heating and air conditioning. Sizes and models per drawings.
- C. This subcontractor is referred to Section 01 40 00, paragraph 1.06, "Trial Units". The General Contractor shall coordinate the construction of a trial unit of each type unit. This subcontractor shall order material and coordinate scheduling to provide complete rough-in and finish of one of each type unit to resolve any problems and coordination between plumbing, heating, electric, framing, etc. Once all problems have been resolved, all typical units shall be constructed the same for the entire project.
- D. This contractor's work shall also include cleaning, testing, balancing, and adjusting the heating and air conditioning systems for proper heating and air distribution to all areas. He shall completely and fully balance all air supply systems to the quantity indicated on the drawings and, in addition, he shall balance these systems to maintain uniform temperatures throughout each space.
- E. It is the intent that the work shall be complete in every respect and that any materials specifically not mentioned or shown on the drawings, but necessary to fully complete the work, shall be furnished.
- F. It is the intent of the Drawings and Specifications to provide for the installation of a heating system which is safe, quiet, and economical in operation, and complete in all respects and which will provide a uniform temperature of 72 degrees in all living spaces and temperatures in other spaces as may be noted on the drawings, when outside temperature is at the outside design temperature established by ASHRAE for the locality. All materials and equipment necessary to accomplish the intent shall be furnished and installed by the contractor.

1.03 RELATED SECTIONS

- A. Ductwork: Section 23 31 00
- B. Electrical: Division 26

1.04 GENERAL REQUIREMENTS

- A. The drawings accompanying these specifications are complimentary to them; whatever is called for by one shall be considered as called for by both unless specifically stated or shown otherwise.
- B. All material and equipment installed under this contract shall be new, undeteriorated, and of a quality not less than the minimum specified herein. All items shall be UL and AGA or equivalent.
- C. All workmanship shall be in accordance with the best practices of the trade.
- D. The duct and piping layout shown on the drawings is schematic; its exact location shall be determined on the job by structural and other conditions. This is not to be construed to mean the design of the system may be changed; it refers only to the exact locations of piping and equipment to fit into the building as construction and the coordination of piping and equipment with the piping and equipment included under other divisions of the Specifications and other trades.
- E. Furnish and install all necessary hangers, supports, straps, and fittings not indicated on the drawings but which are required for a complete and properly installed system with the architectural treatment of the building.
- F. Consult all contractor drawings which may affect the location of piping and equipment and make minor adjustments in location to secure coordination. Other than minor adjustment shall be submitted to the Architect for approval before proceeding with the work.
- G. If units are used during construction, approval must be obtained in writing from the Architect and Owner prior to start up. No units may be used before this written approval is obtained. If units are used during construction, it shall be based on the following conditions:
 - 1. The warranty period shall not begin until turnover to the Owner. At the date of final acceptance by the Owner the units shall be guaranteed for a period of one (1) year.
 - 2. Drywall work must be completed with floor swept and prime coat of paint complete prior to unit start-up.

1.05 CODES, PERMITS AND CERTIFICATES

- A. Materials and workmanship entering into the entire installation shall be in full accordance with all rules and regulations of all state, county, and city authorities having jurisdiction over the premises. This shall include all safety requirements of the National Board of Fire Underwriters as interpreted by the Local Inspection Division. This contractor shall secure and pay all fees required.
- B. The contractor shall not be relieved from compliance with any requirements of the Specifications which are in excess of code requirements and not in conflict therewith.
- C. When work is completed this contractor shall furnish to the Architect, in duplicate, any certificate of inspection that may be required before final payment of this contract will be allowed.

1.06 SUBMITTAL

- A. Immediately upon receipt of a contract, this subcontractor shall prepare shop drawings for submission to the Architect for approval. Submittals shall include the following:
 - 1. Forced air furnaces, coils and pad mounted air conditioning units.

1.07 GUARANTEE

- A. All work under this contract shall be guaranteed against defects in material and workmanship for a period of one (1) year from the date of final acceptance. Should any defects develop within this period, this contractor shall repair them and all damage that might result from same at no expense to the Owner.

1.08 OPERATING AND SERVICE INSTRUCTIONS

- A. This contractor shall place all systems in operating condition and shall instruct the Owner and his representatives in the operation of the system. After completion of instructions, this contractor shall provide the Owner with a binder on all the equipment. Binder shall include equipment cut sheets, wiring diagrams, servicing instructions, parts books, parts supply houses and servicing and maintenance companies that are familiar with the equipment supplied.

1.09 EQUIPMENT INGRESS AND HANDLING

- A. This contractor is solely responsible for purchasing his equipment and materials in such knocked down condition that they will pass through the building openings as may occur incidentally during the building construction.
- B. Equipment suppliers shall package all equipment that requires hoisting in such a manner that it may be hoisted without damage or distortion due to lack of reinforcement of the stressed members.

- C. All equipment items including fans, pumps, control assemblies, electric motors, and air conditioning units shall be stored in a dry building or warehouse until such time they are worked into the various systems. A covering of plastic sheet material shall not be considered sufficient protection.

1.10 ELECTRICAL

- A. The electrical characteristics of all motors are shown on the drawings. The electrical contractor shall furnish and install all motor starters, disconnects, switches and wiring unless furnished with the equipment or specified as a part of the heating, air conditioning, ventilating equipment.
- B. The mechanical contractor shall be responsible for locating all control elements. The mechanical contractor shall be responsible for all thermostat and control wiring.
- C. The mechanical contractor shall furnish the electrical contractor with all necessary wiring diagrams required for the heating and ventilating systems and shall be responsible for their successful operation.
- D. All single phase motor driven equipment furnished by the mechanical contractor shall be furnished with factory equipped built in overload protection.
- E. If substitute is furnished which will require additional wiring to that shown on the contract plans, the contractor must consider this in the preparation of his proposal and he shall be financially responsible for such additional cost of wiring.

PART 2 PRODUCTS

2.01 MATERIALS AND WORKMANSHIP

- A. Equipment
 - 1. Furnish and install, where indicated on the drawings, forced air heat pump blower coils, gas furnaces and pad mounted condensers. Units are based on Bryant, with approved equals by Trane, or Carrier. Units shall all comply with ASHRAE standards. If acceptable equals are to be used, a model for model substitution shall be submitted to the Architect for approval before installation begins. Coordination of installation modifications shall be the responsibility of the heating contractor and this contractor shall be responsible for any increases in the contracts of affected trades. Units shall be Energy Star rated.
 - 2. Cooling units shall be models as indicated on the drawings. All units shall have voltages as shown on drawings.
 - 3. Furnish each unit with a combination heating/cooling nite setback thermostat for systems as manufactured by Bryant, or equal manufacturer listed in paragraph (A) above.
 - 4. Furnish each unit with one disposable type filter. If units are used during construction the filters shall be changed on a regular basis as required. At the time of turn-over for each building the filters shall be replaced with new filters.

5. If furnaces are used during construction, they must be serviced and cleaned prior to acceptance by the Owner.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All workmanship shall be in accordance with general good workmanship practices and applicable codes, and SMACNA Standards.
- B. Equipment shall be installed in accordance with the manufacturer's instructions.
- C. Linesets shall be installed as a single piece of tubing with no fittings or splices except at each connection end. Protect tubing from damage from nails or drywall screws. Route linesets through joints space and door walls. Provide gentle sweep bends on the tubing to prevent any kinks or blockage in the piping. Lineset shall be adequately anchored at the unit and outdoor condenser to prevent any damage from residents. Face connection side of condenser toward building to minimize linesets.
- D. Condensers shall be installed level and plumb on precast condenser pads. Set condensers as close to building as allowed by manufacturer. Where two or more units are installed in the same area space units based on manufacturer's requirements for air flow and service space.
- E. Furnaces shall be leveled and shimmed as needed. Insure unit has no vibration. Install canvas isolation sleeve on plenum so that no vibration is transferred to the ductwork.

3.02 FIRESTOPPING

- A. All ductwork, piping, materials and equipment passing through draftstopping and all fire rated floors or walls shall have complete perimeter sealed by a fire resistant material equal to fire rating of the structure. Material shall be installed per U/L fire test.

3.03 TESTS AND ADJUSTMENTS

- A. The refrigerant piping shall be tested to not less than 150 pounds pressure before it is concealed or covered. After the piping has been tested and proven tight, it shall be thoroughly evacuated and charged with freon gas and flame tested. This contractor shall guarantee tightness of the freon system. He shall furnish all freon required during the first year of operation. The entire installation and piping shall be in compliance with all codes, laws, and ordinances. Any certificates of inspection that may be required shall be secured and submitted to the Architect before final payment of this contract will be made.
- B. The heating, air conditioning and ventilating system shall be put into operation and all mechanical adjustments to the equipment shall be made to insure proper functioning of same. Drivers are to be adjusted to run at proper speeds to deliver the amount of air required and to insure that the motors are of ample size to run full load in continuous service without overheating. Volume dampers shall be set and locked in position to insure that air flow into each area is properly adjusted and equalized. The system and all controls shall be completely tested and adjusted so that each outlet delivers its proper quantity of air. Air quantities shall be measured with an air meter and they shall be rechecked after the final adjustments are made.

3.04 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property, and leave all floors broom clean in all areas affected by his work. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 26 05 19

WIRING & CABLING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTIONS INCLUDED

- A. All labor, materials, equipment and services for all wiring work as shown on the drawings and specified hereinafter.
- B. Some items of work included, without restricting the generality of the word "extent", are as follows:
 - 1. Temporary electric.
 - 2. Feeders, branch wiring and conduit.
 - 3. Coordination of electric service metering, etc. with Power Company.
 - 4. Connection of equipment, whether supplied by this subcontractor or by others.
- C. This subcontractor is referred to Section 01 40 00, paragraph 1.06, "Trial Units". The General Contractor shall coordinate the construction of a trial unit of each type unit. This subcontractor shall order material and coordinate scheduling to provide complete rough-in and finish of one of each type unit to resolve any problems and coordination between plumbing, heating, electric, framing, etc. Once all problems have been resolved, all typical units shall be constructed the same for the entire project.

1.03 RELATED SECTIONS

- A. Telephone and TV cable: Section 27 10 00
- B. Devices: Section 26 27 26
- C. Electric panels: Section 26 24 00
- D. Site electric: Section 26 56 29
- E. Service and metering: Section 26 27 00

1.04 REGULATIONS

- A. All electrical work shall conform to the state and local building code requirements, the National Electric Code and applicable sections of NFPA pamphlets. All codes shall be current edition at the time of start of construction.
- B. All materials shall be new and shall be listed by the Underwriters Laboratories as conforming to its standards and shall also meet OSHA standards in every case where such a standard has been established for the particular material in question.

1.05 PROTECTION OF WORK

- A. The contractor shall effectively protect, at his expense, as much of his work, materials, or equipment as is liable to injury during the construction period. All openings into part of the conduit system, as well as associated fixtures, equipment, etc., both before and after being set in place, must be securely covered or otherwise protected to prevent obstruction of the tools or materials, grit, dirt, or any foreign matter. The contractor will be held responsible for all damage so done until his work is fully and finally accepted. Conduit ends shall be covered with capped bushing.

1.06 CERTIFICATE OF INSPECTION AND PERMITS

- A. The General Contractor shall obtain the General Trades building permit. The Electrical Contractor shall obtain the electrical permit and be responsible for all fees and inspections.

1.07 COORDINATION WITH OTHER TRADES

- A. This subcontractor shall coordinate his work with all other trades concerned, especially the plumbing and heating contractors.

1.08 GUARANTEE

- A. The contractor shall leave the entire electrical system installed under this contract in proper working order and shall, without charge, replace any work or materials which develop defects, except from ordinary wear and tear, within one (1) year from the date of final inspection and acceptance.

1.09 TEMPORARY ELECTRIC SERVICE

- A. The electrical subcontractor shall make provisions for temporary service connection for light and power as may be required by the various trades. This subcontractor shall verify the scope of work (i.e., amperage, voltage, and phase that may be required for contractor machinery) with the General Contractor. Initial temporary electric shall be provided from existing power poles and shall be routed overhead on temporary poles to the buildings. (Wiring may be run on the ground if protected from damage and approved by the General Contractor.) Once transformers have been set, the electrical contractor shall set a temporary meter and panel at the transformer. Once power has been approved to the building meters, the electrical contractor shall energize the refrigerator outlet in each unit.
- B. The cost of installation of temporary service shall be included in the electrical bid. The electrical use charges for temporary service shall be by the General Contractor.

- C. Other temporary service shall include one (1) connection point in each building. Each connection point shall contain two (2) duplex outlets and shall be wired in accordance with OSHA and NEC requirements.

1.10 SUBMITTALS

- A. Immediately upon receipt of a contract this subcontractor shall submit shop drawings to the Architect for approval. Submittals shall include cut sheets, specifications, finishes, wiring diagrams, voltage and phase for all items of electrical equipment supplied and installed by this subcontractor.

1.11 CHARACTER OF MATERIALS AND EQUIPMENT

- A. All materials and equipment, except as herein otherwise noted, shall be new and conform to standards specified herein. Equipment is herein defined to include conduits, cable, wiring materials and devices, panel boards, etc.
- B. All materials and equipment shall be of the approved design. Similar material shall be of one manufacturer wherever possible.
- C. All equipment offered under this specification shall be limited to products regularly produced and recommended for service ratings in accordance with manufacturer's catalogs, engineering data, or other comprehensive literature made available to the public and in effect at the time of opening of bids.
- D. Equipment shall be installed in strict accordance with manufacturer's instructions for type, capacity, and suitability of each piece of equipment used.
- E. This contractor shall obtain these instructions, which shall be considered a part of this specification.

1.12 FIELD MEASUREMENTS

- A. The electrical contractor shall take all field measurements necessary for this work and shall assume responsibility for their accuracy.

1.13 STRUCTURAL DIFFICULTIES

- A. Should any structural difficulties prevent the setting of cabinets, running conductors, etc., at points shown on the plans, the necessary minor deviations, as determined by the Architect, may be permitted in the electrical work and must be made without additional cost.

1.14 DRAWINGS AND SPECIFICATIONS

- A. The drawings are intended to show the general arrangement of outlets. Door swings shall be checked for final arrangements. Contractor shall check all structural and mechanical plans and specifications so that he may coordinate his work with these trades.
- B. All outlets shall be located uniformly with respect to beams, partitions, ducts, openings, etc., and the general locations shall be checked before installing. Should there be any

interference between the electrical outlets and other trades, the contractor shall notify the Architect so that the proper location may be decided upon. The Architect's decision will be final regardless which equipment was first installed.

1.15 RECORD DRAWINGS

- A. During construction keep an accurate record of all deviations between the work as shown on the drawings and that which is actually installed.
- B. Secure from the contractor a complete set of electrical drawings and note changes thereon. Make a complete record of all changes and revisions in a neat and accurate manner.
- C. When all revisions showing the work as finally installed are made, the corrected drawings shall be submitted to the contractor.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Wiring
 - 1. 600 volt single conductor (installed in conduit)
 - a. Conductors shall bear the UL label and conform to ANSI Standards as manufactured by General Electric, Royal, Anaconda, or Kaiser.
 - b. Power to fusible switch panel boards: I/C, stranded copper, type XHHW, for temperature rating as required by code for use.
 - c. Power from fusible switch panel boards to distribution panels and sub-panels: I/C, stranded copper, type XHHW, minimum size #12 AWG, temperature rating as required by code for use.
 - d. Power from panel boards to loads: I/C, stranded copper, type XHHW, minimum size #12 AWG, temperature rating as required by code for use.
 - e. Ground: bare stranded copper or aluminum (same materials as power conductors).
 - f. Ground (#4 AWG and smaller): I/C, stranded copper, type TW or same type as power conductor.
 - g. Control: I/C stranded copper, Type TW, size as required by code.
 - h. Fixture wiring: I/C stranded copper, minimum #14 type to conform with the fixture temperature rating.

2. All wiring in stud and joist spaces shall be nonmetallic sheathed cable, two and three conductor insulated copper plus ground, type NM. Any areas considered by the Building Official to be "commercial" shall be wired with "BX" or conduit. This subcontractor shall review this with the inspector at start of work to avoid problems later on.
3. All underground wiring for site lighting shall be installed in PVC conduit with two or three conductor copper plus ground, per N.E.C.
4. Cable from meter modules to apartment panels shall be type SE, style SER aluminum, three conductor plus bare ground, 300 volt, type XHHW insulation. Braided covering as manufactured by Kaiser or Anaconda. All other wiring shall be copper.

B. Conduit

1. Rigid conduit shall be hot-dipped galvanized steel manufactured by Republic Conduit, Wheatland Tube Co., and Calconduit.

a. Minimum sizes:

General Use	3/4" minimum
Fixture Stems	1/2" minimum
Encased in Concrete	1" minimum

Direct burial PVC may be substituted for underslab installation when approved by all jurisdictions having authority. 90 degree sweeps up through the slab shall remain steel.

2. Aluminum conduit by Kaiser Aluminum, Reynolds Aluminum and Harvey Aluminum is acceptable, if approved by governing agencies.
3. EMT conduit, hot-dipped galvanized steel, electric metallic tubing by Republic Conduit or equals listed in paragraph (A) may be used for all receptacle and lighting branch circuit wiring runs within ceilings and walls (not to be installed in poured concrete or where subject to moisture conditions), if approved by governing authorities.
4. Flexible metallic conduit: threadless, continuous spirally wound and interlock, zinc-coated conforming to UL standard #1 for flexible steel conduit; maximum length 6'-0".
5. Liquid tight flexible steel conduit (similar to flexible metallic conduit except with DVC jacket, type UA "Sealtite" by Anaconda) where necessary or when subject to vibration, connect equipment with 1/2 minimum size "Sealtite" conduit. All motors shall be connected with a short length of "Sealtite".
6. Conduit connectors shall be appropriate for installation as recommended by manufacturer and required by code and shall be by conduit manufacturer.

C. Junction boxes and pull boxes

1. Wherever required to facilitate the pulling of wire, pull boxes shall be installed.
2. All pull boxes shall be equipped with screwed covers.
3. Conduits shall be identified at each terminal point, including terminations at pull or junction boxes, with brass or aluminum tags bearing proper identification.

D. Switch and outlet boxes

1. Hard plastic (non-flexible) boxes or flexible type plastic boxes shall be used in all units. Junction boxes for ceiling fans shall be U/L and NEC approved for installation. Any areas requiring metal sheathed cable shall have zinc-coated or cadmium plated steel boxes.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Grounding: All metallic conduits, supports, cabinets, equipment and the neutral conductors shall be continuous back to the main switch gear and shall be grounded in accordance with the National Electric Code. Also ground the water piping system back to driven grounds.
- B. Outlets and switches shall be installed in locations shown on the drawings. This subcontractor shall study the general building plans in relation to spaces surrounding each outlet in order that his work may fit the work required by these specifications. Boxes shall be installed in a rigid and satisfactory manner.
- C. Branch circuit conductors shall be #12 AWG unless otherwise listed on the drawings. Metallic and non-metallic sheathed cable shall be installed concealed within walls and ceiling. Metallic and non-metallic cable may not be run exposed in any areas. Short runs to motors, kitchen equipment, etc. shall be installed in flexible conduit of Sealtite as is required.
1. All wiring runs shall be kept at least 6" from parallel runs of heating pipes. All runs shall be installed parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings.
- D. Conduit and Tubing
1. Installation: Conduit and tubing, shall be concealed within the walls, ceilings, and floors. All runs shall be kept at least 6" from parallel runs of heating pipes. Exposed runs of conduit or tubing shall have supports spaced not more than 8' apart. All runs of conduit and tubing shall be installed with runs parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings. Right angle turns of conduit or tubing shall consist of case metal fittings or symmetrical bends. Conduit and tubing bends or offsets shall be avoided whenever possible and where necessary made with an approved hickey or conduit bending machine. Conduit or tubing which has been crushed or deformed in any way shall be rejected.

2. Conduit or tubing shall be supported on approved straps, secured by means of expansion bolts in concrete or brick.
3. Conduit and tubing shall be installed in such a manner as to insure against trouble from the collection of trapped condensation and all runs of conduit shall be arranged so as to avoid traps wherever possible. The contractor shall exercise the necessary precautions to prevent the lodging of dirt or trash in conduit tubing, fittings and boxes during the course of installation. A run of conduit or tubing which has become clogged shall be entirely freed of these accumulations or shall be replaced. Conduit shall be securely fastened to all sheet metal outlets, junction and pull boxes with galvanized locknuts and bushings, care being observed to see that the full number of threads project through to permit the bushings to be drawn against the end of the conduit, after which the locknut shall be made up sufficiently tight to draw the bushing into firm electrical contact with the box.

E. Connection to mechanical equipment and motors

1. All power wiring for motors shall be furnished and installed by the electrical subcontractor.
2. This subcontractor is cautioned to note carefully other sections of these specifications describing electrical equipment to be furnished under these sections in order that he may fully understand the wiring requirements.
3. Motor locations shown on the plans are approximate. Obtain the exact location from the contractor installing the motor driven equipment. Do not rough in by scaling the electrical drawings.
4. Furnish and install disconnect switches, motor starters, power wiring and hook-ups for the motors and equipment shown.

3.02 TESTS

- A. The right is reserved to inspect and test any portions of the equipment during the progress of its installation. The contractor shall test all wiring and connections for continuity and grounds before connecting any fixtures. The contractor shall test the entire system in the presence of the Architect or his Engineer, when the work is finally completed, to ensure that all portions are free from short circuits and grounds. All equipment necessary to conduct the above test shall be furnished at the contractor's expense.

3.03 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property and leave all floors broom clean in areas affected by his work. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 26 24 00

PANELS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services for all electric panel work as shown on drawings and specified hereinafter.

1.03 RELATED SECTIONS

- A. Wiring: Section 26 05 19
- B. Electric service & metering: Section 26 27 00
- C. Site Electric: Section 26 56 29

1.04 REGULATIONS

- A. All electrical work shall conform to the state and local building code requirements, the National Electric Code and applicable sections of NFPA pamphlets. All codes shall be current edition at the time of start of construction.
- B. All materials shall be new and shall be listed by the Underwriters Laboratories as conforming to its standards and shall also meet OSHA standards in every case where such a standard has been established for the particular material in question.

1.05 PROTECTION OF WORK

- A. The contractor shall effectively protect, at his expense, as much of his work, materials, or equipment as is liable to injury during the construction period. All openings into part of the conduit system, as well as associated fixtures, equipment, etc., both before and after being set in place, must be securely covered or otherwise protected to prevent obstruction of the tools or materials, grit, dirt, or any foreign matter. The contractor will be held responsible for all damage so done until his work is fully and finally accepted. Conduit ends shall be covered with capped bushing.

1.06 CERTIFICATE OF INSPECTION AND PERMITS

- A. The General Contractor shall obtain the General Trades building permit. The Electrical Contractor shall obtain the electrical permit and be responsible for all fees and inspections.

1.07 SUBMITTALS

- A. Immediately upon receipt of a contract this subcontractor shall submit shop drawings to the Architect for approval. Submittals shall include cut sheets, specifications, finishes, wiring diagrams, voltage and phase for all items of electrical equipment supplied and installed by this subcontractor. All light fixtures shall list bulb type, wattage, and voltage.

1.08 CHARACTER OF MATERIALS AND EQUIPMENT

- A. All materials and equipment, except as herein otherwise noted, shall be new and conform to standards specified herein. Equipment is herein defined to include conduits, cable, wiring materials and devices, panel boards, etc.
- B. All materials and equipment shall be of the approved design. Similar material shall be of one manufacturer wherever possible.
- C. All equipment offered under this specification shall be limited to products regularly produced and recommended for service ratings in accordance with manufacturer's catalogs, engineering data, or other comprehensive literature made available to the public and in effect at the time of opening of bids.
- D. Equipment shall be installed in strict accordance with manufacturer's instructions for type, capacity, and suitability of each piece of equipment used.
- E. This contractor shall obtain these instructions, which shall be considered a part of this specification.

1.09 FIELD MEASUREMENTS

- A. The electrical contractor shall take all field measurements necessary for this work and shall assume responsibility for their accuracy.

1.10 STRUCTURAL DIFFICULTIES

- A. Should any structural difficulties prevent the setting of cabinets, running conductors, etc., at points shown on the plans, the necessary minor deviations, as determined by the Architect, may be permitted in the electrical work and must be made without additional cost.

1.11 RECORD DRAWINGS

- A. During construction keep an accurate record of all deviations between the work as shown on the drawings and that which is actually installed.
- B. Secure from the contractor a complete set of electrical drawings and note changes thereon. Make a complete record of all changes and revisions in a neat and accurate manner.
- C. When all revisions showing the work as finally installed are made, the corrected drawings shall be submitted to the contractor.

PART 2 PRODUCTS

2.01 MATERIALS

A. Panels

1. Lighting panels, sub-panels, feeder panels, and distribution panels shall be model numbers and type as shown on the drawings. Drawings are based on Square "D" with approved equals by I.T.E., Westinghouse, and Cutler Hammer.
2. Panels shall be surface or flush mounted as shown on drawings.
3. All panels, bracing, main breakers, and branch breakers shall have a minimum rating of 10,000 A.I.C.
4. All breakers shall be full size. No half size or tandem breakers shall be permitted.

B. Safety Switches and Disconnects

1. This contractor shall provide a safety switch for each motor unless the motor is within sight of a circuit breaker or horse power switch in a power panel board which can be locked in the open position. Safety type disconnecting switches shall be enclosed, rated in horse power, capable of interrupting the locked rotor current of the motor for which it is used, which current will be assumed six times the rated full load current. Where switches are installed exposed to the weather, they shall be rain tight (NEMA Class 3), switches shall be approved for 250 volt use.
2. Switches shall be as called out on the drawings and as manufactured by Square "D" with approved equals as listed in paragraph (A) above.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Panels shall be installed in locations as shown on the drawings. Bring any conflicts to the attention of the architect.
- B. All work shall be in accordance with the National Electric Code and applicable OBC code requirements.

3.02 TESTS

- A. The right is reserved to inspect and test any portions of the equipment during the progress of its installation. The contractor shall test all wiring and connections for continuity and grounds before connecting any fixtures. The contractor shall test the entire system in the presence of the Architect or his Engineer, when the work is finally completed, to ensure that all portions are free from short circuits and grounds. All equipment necessary to conduct the above test shall be furnished at the contractor's expense.

3.03 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property and leave all floors broom clean in areas affected by his work. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 26 27 00

ELECTRIC SERVICE & METERING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All metering and electric service work
- B. Coordination with the Power Company

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Wiring & cabling: Section: 26 05 19
- B. Electric Panels: Section 26 24 00
- C. Site electric: Section 26 56 29
- D. Telephone & TV cable: Section 27 10 00

1.04 REGULATIONS

- A. All electric service work shall be in accordance with the National Electric Code and the Power Company requirements.
- B. All materials shall be new and shall be listed by the Underwriters Laboratories as conforming to its standards.

1.05 CERTIFICATE OF INSPECTION AND PERMITS

- A. The General Contractor shall obtain the General Trades permit. The Electrical Contractor shall obtain the electric permit and be responsible for all fees and inspections.

1.06 COORDINATION WITH POWER COMPANY

- A. It will be the responsibility of the electrical subcontractor to coordinate the service to the building. The electrical subcontractor shall verify the extent of work for himself and the power company by reviewing the drawings and specifications. Any areas of questions shall be reviewed with the power company.
- B. The electric service for the project shall be as shown on the drawings, voltage, phase and number of wires for power and lighting as supplied by the power company.

- C. All meters shall be supplied by the power company and installed by the electrical contractor. Meter modules shall be supplied and installed by the electrical contractor. Modules shall be sizes and models as shown on the drawings and as manufactured by Square "D", with approved equals by I.T.E., General Electric, and Cutler Hammer. Disconnects and bussing shall have minimum interruption capacities as listed on the drawings.
- D. All items shall be installed in accordance with power company requirements.
- E. Any installation charges or fees shall be by the General Contractor. It is the intention of this specification that the electrical contractor provide all items of labor and materials not provided by the Power Company but necessary for a complete service and metering installation.

1.07 SUBMITTALS

- A. Immediately upon receipt of a contract this subcontractor shall submit shop drawings and cut sheets for all metering equipment and panels.

1.08 CHARACTER OF MATERIALS AND EQUIPMENT

- A. All materials and equipment, except as herein otherwise noted, shall be new and conform to standards specified herein. Equipment is herein defined to include conduits, cable, wiring materials and devices, panel boards, etc.
- B. All materials and equipment shall be of the approved design. Similar material shall be of one manufacturer wherever possible.
- C. All equipment offered under this specification shall be limited to products regularly produced and recommended for service ratings in accordance with manufacturer's catalogs, engineering data, or other comprehensive literature made available to the public and in effect at the time of opening of bids.
- D. Equipment shall be installed in strict accordance with manufacturer's instructions for type, capacity, and suitability of each piece of equipment used.
- E. This contractor shall obtain these instructions, which shall be considered a part of this specification.

1.09 FIELD MEASUREMENTS

- A. The electrical contractor shall take all field measurements necessary for this work and shall assume responsibility for their accuracy.

1.10 STRUCTURAL DIFFICULTIES

- A. Should any structural difficulties prevent the setting of cabinets, running conductors, etc., at points shown on the plans, the necessary minor deviations, as determined by the Architect, may be permitted in the electrical work and must be made without additional cost.

1.11 RECORD DRAWINGS

- A. During construction keep an accurate record of all deviations between the work as shown on the drawings and that which is actually installed.
- B. Secure from the contractor a complete set of electrical drawings and note changes thereon. Make a complete record of all changes and revisions in a neat and accurate manner.
- C. When all revisions showing the work as finally installed are made, the corrected drawings shall be submitted to the contractor.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Meter Modules
 - 1. Meter modules shall be model numbers as shown on the drawings. Units shall be Square D with equals by Siemens and ITE. Units shall be raintight NEMA 3R suitable for outdoor installation.
 - 2. Main disconnects shall be model number on the drawings by Square D. Unit shall be fusible with correct limiting fuses by Bussman. Units shall be compatible with meter modules and suitable for outdoor installation.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Installation shall be as shown on the drawings and per NEC.
- B. Coordinate grounding with foundation ground and ground rod.
- C. Coordinate final connections of secondary cable being installed from the transformer to the meter with the Power Company. Provide conduit from the meters to below grade if required by the Power Company.
- D. Provide final inspection approvals prior to Power Company energizing the meter centers.

3.02 TESTS

- A. The right is reserved to inspect and test any portions of the equipment during the progress of its installation. The contractor shall test all wiring and connections for continuity and grounds before connecting any fixtures. The contractor shall test the entire system in the presence of the Architect or his Engineer, when the work is finally completed, to ensure that all portions are free from short circuits and grounds. All equipment necessary to conduct the above test shall be furnished at the contractor's expense.

3.03 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property and leave all floors broom clean in areas affected by his work. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services for all wiring device work as shown on drawings and specified hereinafter.

1.03 RELATED SECTIONS

- A. Wiring: Section 26 05 19

1.04 REGULATIONS

- A. All electrical work shall conform to the state and local building code requirements, the National Electric Code and applicable sections of NFPA pamphlets. All codes shall be current edition at the time of start of construction.
- B. All materials shall be new and shall be listed by the Underwriters Laboratories as conforming to its standards and shall also meet OSHA standards in every case where such a standard has been established for the particular material in question.

1.05 PROTECTION OF WORK

- A. The contractor shall effectively protect, at his expense, as much of his work, materials, or equipment as is liable to injury during the construction period. All openings into part of the conduit system, as well as associated fixtures, equipment, etc., both before and after being set in place, must be securely covered or otherwise protected to prevent obstruction of the tools or materials, grit, dirt, or any foreign matter. The contractor will be held responsible for all damage so done until his work is fully and finally accepted. Conduit ends shall be covered with capped bushing.

1.06 CERTIFICATE OF INSPECTION AND PERMITS

- A. The General Contractor shall obtain the General Trades building permit. The Electrical Contractor shall obtain the electrical permit and be responsible for all fees and inspections.

1.07 SUBMITTALS

- A. Immediately upon receipt of a contract this subcontractor shall submit shop drawings to the Architect for approval. Submittals shall include cut sheets, specifications, finishes, wiring diagrams, voltage and phase for all items of electrical equipment supplied and installed by this subcontractor. All light fixtures shall list bulb type, wattage, and voltage.

1.08 CHARACTER OF MATERIALS AND EQUIPMENT

- A. All materials and equipment, except as herein otherwise noted, shall be new and conform to standards specified herein. Equipment is herein defined to include conduits, cable, wiring materials and devices, panel boards, etc.
- B. All materials and equipment shall be of the approved design. Similar material shall be of one manufacturer wherever possible.
- C. All equipment offered under this specification shall be limited to products regularly produced and recommended for service ratings in accordance with manufacturer's catalogs, engineering data, or other comprehensive literature made available to the public and in effect at the time of opening of bids.
- D. Equipment shall be installed in strict accordance with manufacturer's instructions for type, capacity, and suitability of each piece of equipment used.
- E. This contractor shall obtain these instructions, which shall be considered a part of this specification.

1.09 DRAWINGS AND SPECIFICATIONS

- A. The drawings are intended to show the general arrangement of outlets. Door swings shall be checked for final arrangements. Contractor shall check all structural and mechanical plans and specifications so that he may coordinate his work with these trades.
- B. All outlets shall be located uniformly with respect to beams, partitions, ducts, openings, etc., and the general locations shall be checked before installing. Should there be any interference between the electrical outlets and other trades, the contractor shall notify the Architect so that the proper location may be decided upon. The Architect's decision will be final regardless which equipment was first installed.

1.10 RECORD DRAWINGS

- A. During construction keep an accurate record of all deviations between the work as shown on the drawings and that which is actually installed.
- B. Secure from the contractor a complete set of electrical drawings and note changes thereon. Make a complete record of all changes and revisions in a neat and accurate manner.
- C. When all revisions showing the work as finally installed are made, the corrected drawings shall be submitted to the contractor.

PART 2 PRODUCTS

2.01 MATERIALS

A. Switches

1. Flush wall switches shall be rated 15 amps, 120-277 volt A.C. specification grade and shall have totally enclosed operating mechanism. Switches shall be Leviton with approved equals by Pass and Seymour, or approved equal. Toggle switches shall be as follows: (Color: White)

1 pole	1451-W
3 way	1453-W

2. Where more than one gang is indicated in the same location, switches shall be mounted in gangs under a common plate.

B. Receptacles

1. Plug receptacles in general shall be tamper proof flush duplex grounded type rated 15 amps 125 volts, Leviton (White) or approved equals listed in (A) above. Weatherproof receptacles shall have non-conductive neoprene hinged cover mounted on a stainless steel plate (corrosion resistant) and neoprene gasket.
2. Miscellaneous bath, kitchen, outdoor and wet area receptacles required by code shall be Leviton ground trip receptacle with ground fault protection, specification grade, White. (Units may be feed-thru or end of line, as is applicable.)

C. Wall Plates

1. All switches, outlets, etc., shall be provided with White covered plastic plates. Plates shall be by Leviton, Pass and Seymour, or approved equal. Plates shall be "straight" line series 3900-1 for switches and outlets (ganged as shown on drawings).

D. Range and Dryer Receptacle

1. Range and dryer cord set is supplied with the unit. Provide surface receptacle Leviton, Model #279, 40 amp - verify pigtail to be supplied with range, 125/250 volt. Approved equals are listed in paragraph D. 1. above. Provide Leviton #278 30 amp recessed receptacle for dryer.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All work shall be in accordance with the manufacturer's printed instructions, the NEC and OBC.
- B. Care shall be taken not to damage any surrounding finish surfaces during the installation of devices and plates. Any damage to adjacent finished wall surfaces, cabinetry etc, shall be corrected by others at the expense of this contractor.

3.02 TESTS

- A. The right is reserved to inspect and test any portions of the equipment during the progress of its installation. The contractor shall test all wiring and connections for continuity and grounds before connecting any fixtures. The contractor shall test the entire system in the presence of the Architect or his Engineer, when the work is finally completed, to ensure that all portions are free from short circuits and grounds. All equipment necessary to conduct the above test shall be furnished at the contractor's expense.

3.03 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property and leave all floors broom clean in areas affected by his work. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 26 50 00

LIGHTING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services for all lighting fixture work as shown on drawings and specified hereinafter.

1.03 RELATED SECTIONS

- A. Wiring: Section 26 05 19
- B. Site lighting: Section 26 56 19
- C. Wiring devices: Section 26 27 26

1.04 REGULATIONS

- A. All electrical work shall conform to the state and local building code requirements, the National Electric Code and applicable sections of NFPA pamphlets. All codes shall be current edition at the time of start of construction.
- B. All materials shall be new and shall be listed by the Underwriters Laboratories as conforming to its standards and shall also meet OSHA standards in every case where such a standard has been established for the particular material in question.

1.05 PROTECTION OF WORK

- A. The contractor shall effectively protect, at his expense, as much of his work, materials, or equipment as is liable to injury during the construction period. All openings into part of the conduit system, as well as associated fixtures, equipment, etc., both before and after being set in place, must be securely covered or otherwise protected to prevent obstruction of the tools or materials, grit, dirt, or any foreign matter. The contractor will be held responsible for all damage so done until his work is fully and finally accepted. Conduit ends shall be covered with capped bushing.

1.06 CERTIFICATE OF INSPECTION AND PERMITS

- A. The General Contractor shall obtain the General Trades building permit. The Electrical Contractor shall obtain the electrical permit and be responsible for all fees and inspections.

1.07 SUBMITTALS

- A. Immediately upon receipt of a contract this subcontractor shall submit shop drawings and fixture cut sheets for approval of the Architect.
- B. If alternate fixtures are being submitted for review the fixture shall match the specified fixture in appearance, finish and bulb quantity and wattage. Alternate will not be reviewed unless the fixture is in fact a “match” for the listed fixture.

1.08 CHARACTER OF MATERIALS AND EQUIPMENT

- A. All materials and equipment, except as herein otherwise noted, shall be new and conform to standards specified herein. Equipment is herein defined to include conduits, cable, wiring materials and fixtures.
- B. All materials and equipment shall be of the approved design. Similar material shall be of one manufacturer wherever possible.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Lighting fixtures and lamps
 - 1. All light fixtures shall be the manufacturer and model numbers listed on the drawings. All fixtures shall be UL listed for the use proposed.
 - 2. Equal fixtures may be proposed for approval only if the fixture matches the specified unit in “appearance”, size, finish and bulb quantity and wattage.
 - 3. Install lamps in all fixtures furnished under this contract, in accordance with the fixture schedule. Lamps shall be new and unused prior to installation. All lamps shall be in working order at the time of final acceptance of the work by the Owner and the Architect. Fluorescent lamps shall be standard cool white. Other lamps as called for in the fixture schedule.
 - 4. Fixtures shall be cleaned of dirt inside and outside. No fixtures shall be installed until painting work of the General Contractor is completed. Damaged fixtures shall be replaced.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Fixtures shall be installed in accordance with the manufacturer’s written instructions. Provide all manufacturers’ installation accessories required that match and are compatible with the fixture.

- B. Installation shall conform to all requirements of the UL rating of the fixture and applicable NEC and OBC codes. No fixture shall be installed in a location in violation of the UL rating (i.e. damp proof, weather proof, etc.)

3.02 TESTS

- A. The right is reserved to inspect and test any portions of the equipment during the progress of its installation. The contractor shall test all wiring and connections for continuity and grounds before connecting any fixtures. The contractor shall test the entire system in the presence of the Architect or his Engineer, when the work is finally completed, to ensure that all portions are free from short circuits and grounds. All equipment necessary to conduct the above test shall be furnished at the contractor's expense.

3.03 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property and leave all floors broom clean in areas affected by his work. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 26 56 29

SITE LIGHTING – DISTRIBUTION

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTIONS INCLUDES

- A. Provide all labor, materials, equipment and services necessary for all site electrical work as shown on the drawings and specified hereinafter.
- B. Some items of work included are:
 - 1. Coordination of site telephone distribution, TV cable, and panels, and conduit that are to be supplied by the electrical contractor.
 - 2. Coordination of site electric distribution with the power company. The Power Company shall trench and backfill for the secondary from the transformer to the building. Coordinate mounting of meters, telephone and cable boxes and assist with wire installation as required by the Utility Companies.
 - 3. Supply and install all site lighting fixtures, concrete mounting bases, conduit and underground wiring. Provide trenching, backfill, conduit and wire and make all connections as required.
 - 4. The general contractor shall pay any fees or additional charges involved in installing the electrical service to the building as shown on the drawings. This work shall be coordinated with the power company.

1.03 RELATED SECTIONS

- A. All overhead and underground primary work, transformers, and metering are by the power company.
- B. All telephone cable work is by the telephone company.
- C. TV cable work is by the TV cable company.
- D. Trenching and backfill for electric primary, gas main, cable and telephone distribution up to the transformers shall be by others.
- E. Conduit under pavement for electric primary shall be installed by the Site Utility Contractor.

1.04 SUBMITTALS

- A. Immediately upon receipt of a contract, this contractor shall submit shop drawings to the Architect or approval. Submittals shall include cut sheets and specifications for all site lighting equipment (poles, ballasts, wattage, voltage, finish, lens construction, etc.) and installation details for all equipment.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Conduit for site lighting wiring shall be PVC, sizes as shown on drawings. All wiring shall be as specified in Division 26 and as required by the National Electric Code.
- B. All conduit and wiring for electrical distribution work not done by utility company, as shown on the drawings shall be as specified in Division 26 and as required by the National Electric Code and local power company.
- C. All site lighting fixtures shall be the type as specified on the site lighting fixture schedule and shall be supplied complete with ballasts, bulbs, and accessories as called for on the drawings.
- D. Concrete for site light bases shall be in accordance with Section 03300.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Site lights shall have posts installed on concrete bases in accordance with details shown on the drawings. All posts shall be securely anchored to withstand wind load. An auger shall be used to excavate for post bases without disturbing adjoining soil. Pour excavated hole full with a "Sonetube" section used as a form for the above grade portion of the concrete. After bases have been poured they shall be marked with 3 wood stakes (2'-6" above grade) approximately 2'-0" from base and wrapped in a triangle with yellow caution tape to prevent damage from equipment.
- B. Wiring for site lights shall be installed in conduit with 2 or 3 conductors and shall be buried a minimum of 24" below grades and shall be routed to avoid interference with landscaping and site utility work. This contractor shall review the landscaping and site utility drawings before starting work. Any conduit and wiring damaged by excavation of other trades due to poor coordination with these trades shall be repaired by this contractor at his expense.
- C. Trenches for wiring shall be backfilled with granular soil free of clods and rocks. Trenches shall be compacted so as to prevent settling. Use bank run gravel under paving.
- D. Wiring shall be completed before final grading, sodding and seeding is started. Scheduling of this work shall be coordinate with the General Superintendent. If this contractor fails to install site lighting before sodding and seeding work is completed, this contractor shall be responsible for repairing all landscaping work to its original condition.
- E. All telephone and electrical distribution work shall be in accordance with the requirements of the utility companies and the National Electric Code (where applicable).

3.02 CLEAN UP

- A. This subcontractor shall restore all site areas to their original condition. Any spoil left from trenching shall be removed by this contractor.

END OF SECTION

SECTION 27 10 00

TELEPHONE, TV CABLE & HIGH-SPEED INTERNET

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary for all telephone and TV cable rewiring. Work shall include installation of junction boxes with cover plates as shown on the drawings and wiring to the building panel.
- B. This subcontractor is referred to Section 01 40 00 Paragraph 1.06 "Trial Units". The General Contractor shall coordinate the construction of a trial unit of each type unit. This subcontractor shall order material and coordinate scheduling to provide complete rough-in and finish of one of each type unit to resolve any problems and coordination between plumbing, heating, electric, framing, etc. Once all problems have been resolved, all typical units shall be constructed the same for the entire project.

1.03 RELATED SECTIONS

- A. Wiring: Section 26 05 19
- B. Telephone and TV cable service up to the panel on the building shall be by the telephone and TV cable company.
- C. Telephone and TV cable equipment shall be by the Tenant.

1.04 REGULATIONS

- A. All electrical work shall conform to the state and local building code requirements, the National Electric Code and applicable sections of NFPA pamphlets. All codes shall be current edition at the time of start of construction.
- B. All materials shall be new and shall be listed by the Underwriters Laboratories as conforming to its standards and shall also meet OSHA standards in every case where such a standard has been established for the particular material in question.

1.05 PROTECTION OF WORK

- A. The contractor shall effectively protect, at his expense, as much of his work, materials, or equipment as is liable to injury during the construction period. All openings into part of the conduit system, as well as associated fixtures, equipment, etc., both before and after being set in place, must be securely covered and otherwise protected to prevent obstruction of the tools or materials, grit, dirt, or any foreign matter. The contractor will be held responsible for all damage so done until his work is fully and finally accepted. Conduit ends shall be covered with capped bushing.

1.06 CERTIFICATE OF INSPECTION AND PERMITS

- A. The General Contractor shall obtain the General Trades building permit. The Electrical Contractor shall obtain the electrical permit and be responsible for all fees and inspections.

1.07 COORDINATION WITH TELEPHONE AND TV CABLE COMPANY

- A. It shall be the responsibility of the electrical subcontractor to schedule and coordinate the wiring and installation of the telephone service. Work shall be scheduled to be performed along with electrical rough-in so as not to delay drywall work.
- B. The electrical subcontractor shall review the drawings for work to be performed by himself and by the TV cable company. It is the intent of this specification that the electrical subcontractor provides all labor and material not supplied by the TV cable and telephone company but required for a complete and operational system. All TV cable work is to be performed by Warner Cable. All telephone work beyond the telephone company pedestal shall be by the Electrical Subcontractor. This shall include all prewire, interface in mechanical room and telephone jacks.

1.08 COORDINATION WITH OTHER TRADES

- A. This subcontractor shall coordinate his work with all other trades concerned, especially the plumbing and heating contractors.

1.09 GUARANTEE

- A. The contractor shall leave the entire electrical system installed under this contract in proper working order and shall, without charge, replace any work or materials which develop defects, except from ordinary wear and tear, within one (1) year from the date of final inspection and acceptance.

1.10 SUBMITTALS

- A. Immediately upon receipt of a contract this subcontractor shall submit shop drawings to the Architect for approval.

1.11 CHARACTER OF MATERIALS AND EQUIPMENT

- A. All materials and equipment, except as herein otherwise noted, shall be new and conform to standards specified herein. Equipment is herein defined to include conduits, cable, wiring materials and devices, panel boards, etc.
- B. All materials and equipment shall be of the approved design. Similar material shall be of one manufacturer wherever possible.
- C. All equipment offered under this specification shall be limited to products regularly produced and recommended for service ratings in accordance with manufacturer's catalogs, engineering data, or other comprehensive literature made available to the public and in effect at the time of opening of bids.
- D. Equipment shall be installed in strict accordance with manufacturer's instructions for type, capacity, and suitability of each piece of equipment used.
- E. This contractor shall obtain these instructions, which shall be considered a part of this specification.

1.12 FIELD MEASUREMENTS

- A. The electrical contractor shall take all field measurements necessary for this work and shall assume responsibility for their accuracy.

1.13 STRUCTURAL DIFFICULTIES

- A. Should any structural difficulties prevent the setting of cabinets, running conductors, etc., at points shown on the plans, the necessary minor deviations, as determined by the Architect, may be permitted in the electrical work and must be made without additional cost.

1.14 DRAWINGS AND SPECIFICATIONS

- A. The drawings are intended to show the general arrangement of outlets. Door swings shall be checked for final arrangements. Contractor shall check all structural and mechanical plans and specifications so that he may coordinate his work with these trades.
- B. All outlets shall be located uniformly with respect to beams, partitions, ducts, openings, etc., and the general locations shall be checked before installing. Should there be any interference between the electrical outlets and other trades, the contractor shall notify the Architect so that the proper location may be decided upon. The Architect's decision will be final regardless which equipment was first installed.

1.15 RECORD DRAWINGS

- A. During construction keep an accurate record of all deviations between the work as shown on the drawings and that which is actually installed.
- B. Secure from the contractor a complete set of electrical drawings and note changes thereon. Make a complete record of all changes and revisions in a neat and accurate manner.
- C. When all revisions showing the work as finally installed are made, the corrected drawings shall be submitted to the contractor

PART 2 PRODUCTS

2.01 MATERIALS

- A. Junction Boxes
 - 1. All wall boxes shall be single gang in accordance with section 26 05 19. Boxes shall be UL listed for both rated and nonrated walls as applicable per plan locations.
- B. Wiring
 - 1. Wiring for all telephone and TV cable shall be in accordance with the requirements of the telephone and TV cable company. Wire shall be UL Listed for the applicable installation and meet all flame spread ratings. Review requirements and recommendations for wire with the telephone and TV cable providers.
- C. Junction and termination box mounted on the building adjacent to the electric meters shall be provided by the telephone and TV cable company.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Grounding: All metallic conduits, supports, cabinets, equipment and the neutral conductors shall be continuous back to the main panel and shall be grounded in accordance with the National Electric Code.
- B. Install cable and telephone outlets in locations shown on the drawings. Each outlet shall be home run as required by the telephone and cable to the termination box mounted on the building.
- C. Coordinate mounting of the termination box and telephone and TV cable service installation.
- D. Provide all labor and materials needed for a complete installation. Any labor or materials not provided by the telephone and TV cable companies shall be provided by this contractor.

3.02 TESTS

- A. The right is reserved to inspect and test any portions of the equipment during the progress of its installation. The contractor shall test all wiring and connections for continuity and grounds before connecting any fixtures. The contractor shall test the entire system in the presence of the Architect or his Engineer, when the work is finally completed, to ensure that all portions are free from short circuits and grounds. All equipment necessary to conduct the above test shall be furnished at the contractor's expense.

3.03 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property and leave all floors broom clean in areas affected by his work. Cardboard boxes shall be broken down before placing in dumpster.

END OF SECTION

SECTION 28 31 00

FIRE ALARM SYSTEM

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the Instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services for a complete fire alarm system as shown on the drawings and specified herein after.

1.03 RELATED SECTIONS

- A. Wiring & Cable: Section 26 05 19
- B. Fire Detection Units: Section 28 31 43

1.04 STANDARDS

- A. The fire alarm equipment and installation shall comply with current provisions of the following standards and shall be listed for its intended purpose and be compatibility listed to insure integrity of the complete system.

1. National Electric Code. Article 760
2. National Fire Protection Association Standards

NFPA 70	National Electrical Code
NFPA 72	National Fire Alarm Code
NFPA 101	Life Safety Code

3. Local and State Building Codes

4. Underwriters Laboratories Inc.

- a. All equipment shall be approved by Underwriters Laboratories, Inc. for its intended purposed, listed as power limited by Underwriters Laboratories, Inc., for the following standards as applicable:

UL 864 UOJZ	Control units for Fire Protective Signaling Systems Local Signaling Unit Central Station Signaling Protected Premises Unit Remote Signaling Protected Premises Unit
UL 268	Smoke Detectors for Fire Protective Signaling systems
UL 268A	Smoke Detectors for duct applications
UL 521	Heat Detectors for Fire Protective Signaling systems

UL 228	Door Holders for Fire Protective Signaling systems
UL 464	Audible Signaling appliances
UL 1638	Visual Signaling appliances
UL 38	Manually Activated Signaling Boxes
UL 346	Waterflow indicators for Fire Protective Signaling systems

5. Americans with Disabilities Act (ADA)

- a. All visual Notifications appliances and manual pull stations shall comply with the requirements of the Americans with Disabilities Act.

1.05 MANUFACTURERS SERVICES

- A. The following supervision shall be provided by a factory trained service technician from the distributor of the fire alarm equipment. The technician shall be trained and shall have a minimum of two (2) years of service experience in the fire alarm industry. The technicians name shall appear on equipment submittals and a copy of the manufacturer's training shall be sent to the project engineer. The technician shall be responsible for the following items:
 1. A pre installation visit to the job site to review equipment submittals and to verify the method by which the system is to be wired.
 2. During the installation the certified technician shall be on site or make periodic visits to verify installation and wiring of the system. He shall also supervise the completion of conduit rough, wires pulled into conduit and wiring rough, and ready for trim.
 3. Upon completion of wiring, final checkout and certification of the system shall be made under the supervision of this technician.
 4. At the time of the formal checkout, technician shall give operational instructions to the owner and or his representative on the system.

1.06 SUBMITTALS

The contractor shall submit three (3) complete sets of documentation after award of the purchase order. Indicated in the document will be the type, size, rating, style, catalog number, manufacturers name, photos, and/or catalog data sheets for all items proposed to meet these specifications. The proposed equipment shall be subject to the approval of the Architect/Engineer and no equipment shall be ordered or installed on the premises without that approval.

1.07 CLOSE-OUT SUBMITTAL

- A. Deliver two (2) copies of the following to the owner's representative within thirty (30) days of system acceptance. The closeout submittals shall include:
 1. Installation and Programming manuals for the installed Life Safety System.
 2. Point to point diagrams of the entire Life Safety System as installed. This shall include all connected Smoke Detectors and addressable field modules.
 3. All drawings must reflect device address as verified in the presence of the engineer and/or end user.

1.08 WARRANTY

- A. Warranty all materials, installation and workmanship for a one (1) year period, unless otherwise specified. A copy of the manufacturer warranty shall be provided with the close out documentation.

PART 2 PRODUCTS

2.01 GENERAL

A. Control Panel

1. The fire alarm control panel (FACP) shall be the Silent Knight 5600 analog addressable control panel. The FACP must have a 2 amp power supply. Approved equal by Simplex. Provide battery back-up capable to power system as required by Code. System shall automatically recharge batteries and electronically supervise battery status.
2. The FACP must have Drift Compensation sensitivity capabilities on detectors and be capable of supporting up to 25 detectors and modules in any combination on one SLC loop.
3. The FACP must support a minimum of two programmable NAC circuits.
4. The FACP must have a built in UL approved dual line digital communicator. The communicator must transmit in SIA and CID.
5. The FACP must automatically test the smoke detectors in compliance with NFPA standards to ensure that they are within listed sensitivity parameters and listed with Underwriters Laboratories for this purpose.
6. The FACP must compensate for the accumulation of the contaminants that affect detector sensitivity.
7. The FACP must have maintenance alert feature (differentiated from trouble condition).
8. The FACP shall have Jumpstart feature that can automatically enroll all properly connected accessories into a functional system within 60 seconds of powering up the panel. Panels that do not have these capabilities will not be accepted.

B. System Wiring

1. The signaling Line Circuit (SLC) shall be wired with standard NEC 760 compliant wiring, no twisted, shielded or mid capacitance wiring is required for standard installations. All FACP screw terminals shall be capable of accepting 12-22 AWG wire. All system wiring shall be in accordance with the requirements of NFPA 70, the National Electrical Code (NEC) and also comply with article 760 of the NEC.

C. Signaling Line Circuits

1. Each SLC shall be capable of a wiring distance of 10,000 feet from the SLC driver (panel) and be capable of supporting any combination of detectors and modules up to 25 devices. The communication protocol to SLC devices must be digital. Any SLC loop

device, which goes into alarm, must interrupt the polling cycle for priority response from the FACP. The FACP must respond consistently to a device that goes into alarm on an SLC in under 3 seconds. The SLC shall be capable of functioning in a class B configuration.

D. SLC loop devices

1. Devices supported must include addressable photoelectric detectors, addressable photoelectric detectors with thermal, addressable photoelectric duct detectors, addressable heat detectors, addressable input modules, and relay output modules. There is to be no limit to the number of any particular device type up to the maximum of 25 detectors and modules that can be connected to the SLC.

E. Addressable detector functions

1. The products of combustion detectors must communicate analog values using a digital protocol to the control panel for the following functions:
 - a. Automatic compliance with NFPA 72 standards for detector sensitivity testing
 - b. Drift compensation to assure detector is operating correctly
 - c. Maintenance alert when a detector nears the trouble condition
 - d. Trouble alert when a detector is out of tolerance
 - e. Alert control panel of analog values that indicate fire

F. Programmable NAC's

1. The FACP shall support two programmable NAC (Notification Appliances Circuit) circuits that are capable of being programmed as supervised reverse polarity notification circuits or supervised auxiliary power circuits that can be programmed as continuous, resettable or door holder power. Each NAC circuit shall support up to 2 amps. Each auxiliary power circuit shall support up to 1 amp.

G. Annunciators

1. The main control must have a built in annunciator with three characters of display each consisting of seven segments and feature LED's for AC, General Trouble, Silenced, Ground Fault, Low Battery, Walk Test, NAC 1 and 2 Active and Trouble, and Zones 1 through 5 Alarm, Supervisory, and Trouble. All control and programming keys are a membrane style buttons. The annunciator must be able to silence and reset alarms by opening the cabinet door and pressing SILENCE or RESET once. The annunciator must have an installer code that will allow the limitation of operating system programming to authorize individuals.

H. Digital Communicator

1. The digital communicator must be an integral part of the control panel and be capable of reporting all zones or points of alarm, supervisory, and trouble as well as all system status information such as loss of AC, low battery, ground fault, loss of supervision to any remote devices with individual and distinct messages to a central station or remote station.

2. The communicator must be capable of reporting via SIA and contact ID formats. The communicator shall have a delay AC loss report function which will provide a programmable report delay to help ease traffic to the central station during a power outage. No controls that use External modems for remote programming and diagnostics shall be accepted.

I. Dry Contacts

1. The FACP will have three form "C" dry contacts, one will be dedicated to trouble conditions, the other two will be programmable for general alarm, general supervisory, resettable auxiliary power, or door holder power conditions. The trouble contact shall be normal in an electrically energized state so that any total power loss (AC and Backup) will cause a trouble condition. In the event that the microprocessor or the FACP fails then trouble contacts shall also indicate a trouble condition.

J. Ground Fault Detection

1. A ground detection circuit, to detect positive and negative grounds on all wiring. The ground fault detector shall operate the general trouble devices as specified but shall not cause an alarm to be sounded. Ground fault will not interfere with normal operation, such as alarm, or other trouble conditions.

K. Over Current Protection

1. All low voltage circuits will be protected by microprocessor controlled power limiting or have a self restoring polyswitches for the following: smoke detector power, main power supply, indicating appliances circuits, battery standby power and auxiliary output.

L. Test Functions

1. A "Lamp Test" mode shall be a standard feature of the fire alarm control panel and shall test all LED's on the main panel.
2. A "Walk Test" mode shall be a standard feature of the fire alarm control panel. The walk test feature shall function so that each alarm input test will operate the associated notification appliance for three seconds. The FACP will then automatically perform a reset and confirm normal device operation.
3. A "Fire Drill" mode shall allow the manual testing of the fire alarm system notifications circuits. The "Fire Drill" shall be capable of being controlled at the main annunciator.
4. A "Disable Mode" shall allow for any zone or NAC circuit to be disabled without effecting the operation of the total fire system.

M. Input/Output Activation Structure

1. There are 5 software zones available on the panel. Each zone provides 15 alarm SLC addresses and 5 supervisory SLC addresses. SLC input device type choices are Unused, Detector, Manual Pull Switch, Latching Water Flow Switch or Non-Latching Water Flow Switch. The notification circuits can be configured to active for any combination of zone alarms and/or supervisories. The on-board relays can be selected

to activate for general alarm, general supervisory, resettable auxiliary power, or door holder power. The SLC relays will active under a fixed mapping structure where a specific SLC address on the relay module dictates what condition it will activate under, ie. SLC relay addresses 111 and 112 will activate for zone 1 alarm conditions.

2. Each NAC circuits can be configured to produce one of six output patterns: Constant On, ANSI, AMSECO synchronization, Gentrex synchronization, System Sensor synchronization, and Wheelock synchronization.

2.02 SYSTEM OPERATION

A. Alarm

1. When a device indicates any alarm condition the control panel must respond within 3 seconds. The zone alarm LED for the particular zone in alarm will light.
2. When the alarm devices is restored to normal, the control panel shall require to be manually reset to clear the alarm condition, except those that are non-latching types.
3. An alarm shall be silenced by pressing the Signal Silence key once on the control panel. When silenced, this shall not prevent the resounding of subsequent events if another event should occur (subsequent alarm feature). When alarms are silenced, the silenced LED on the control panel will remain lit until the alarmed device is returned to normal and/or the panel reset.

B. Troubles

1. When a device indicates a trouble condition, the specific zone or system trouble LED will light along with the General Trouble LED.
2. When the device in trouble is restored to normal, the control panel shall be automatically reset.
3. A trouble shall be silenced by pressing the Signal Silence key once on the control panel. When silenced, this shall not prevent the resounding of subsequent events if another event should occur. When troubles are silenced, the Silenced LED on the control panel will remain lit until the trouble condition is returned to normal.

C. Supervision methods

1. Each SLC loop shall be electrically supervised for opens and ground faults in the circuit wiring, and shall be so arranged that a fault condition on any loop will not cause an alarm to sound. Additionally, every addressable device connected to the SLC will be supervised and individually identified if in a fault condition. The occurrence of any fault will light a trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition.
2. Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults, on the circuit wiring, and shall be so arranged that a fault condition on any indicating appliance circuit or group of circuits will not cause an alarm to sound. The occurrence of any fault will light the trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition.

2.03 CONTROL UNIT

- A. System Cabinet shall be recess mounted.
- B. Audible System Trouble Sounder.
 - 1. An audible system trouble sounder shall be an integral part of the control unit.

2.04 POWER SUPPLY AND CHARGER

- A. The entire system shall operate on 24 VDC, filtered switch mode power supply with the rated current available of 2 Amps. The FACP must have a battery charging circuit capable of complying with the following requirements:
 - 1. Sixty (60) hours of battery standby with five (5) minutes of alarm signaling at the end of this sixty (60) hour period (as required per NFPA 72 remote station signaling requirements) using rechargeable batteries with automatic charger to maintain standby gel-cell batteries in a fully charged condition.
OR
Twenty-four (24) hours of battery standby with five (5) minutes of alarm signaling at the end of this twenty-four (24) hour period (as required per NFPA 72 central station signaling requirements) using rechargeable batteries with automatic charger to maintain gel-cell batteries in a fully charged condition.
- B. The power supply shall comply with U.L. Standard 864 for power limiting.
- C. The FACP will indicate a trouble condition if there is a loss of AC power or if the batteries are missing or of insufficient capacity to support proper system operation in the event of AC failure. A "Battery Test" will be performed automatically every minute to check the integrity of the batteries. The test must disconnect the batteries from the charging circuit and place a load on the battery to verify the battery condition.
- D. In the event that it is necessary to provide additional power one or more of the model 5496 or 5499 distributed power modules shall be used to accomplish this purpose.

PART 3 EXECUTION

3.01 DEVICE INSTALATION PER DRAWINGS

- A. Manual Fire Alarm Stations
 - 1. Manual Fire Alarm Stations shall be non-coded, break glass, single or double action type, with a key operated test-reset lock in order that they may be tested, and so designed that after actual emergency operation, they cannot be restored to normal except by use of a key. The reset key shall be so designed that it will reset manual station and open FACP without use of another key. An operated station shall automatically condition itself so as to be visually detected, as operated, at a minimum

distance of fifty feet, front or side. Manual stations shall be constructed of LEXAN® with clearly visible operating instructions on the front of the stations in raised letters. Stations shall be suitable for surface mounting on matching backbox, or semi-flush mounting on a standard single-gang box, and shall be installed within the limits defined by the Americans with Disabilities Act (ADA) dependent on manual station accessibility or per local requirements. Manual stations shall be Model SK-Pull-SA or SK-Pull-DA. If using conventional pull stations they must be installed in conjunction with an Addressable Input Module (HFS-MM). Manual stations shall be Silent Knight Model PS-DATK, PS-SATK, PS-DA or PS-SA and Underwriters Laboratories listed when used with addressable modules.

B. Remote Power Supplies

1. The remote power supply model 5495 or 5499 may also be used on the system. These power supplies support 6amps or 9amps of 24VDC power with 4 notification circuits rated at 3amps each. These power boosters are activated from a notification circuit on the fire panel.

C. Notification Devices

1. The visual and audio/visual signaling devices shall be compatible with the 5600, 5495, and 5499 as stated in the installation manuals and be Listed with Underwriters Laboratories Inc. per UL 1971 and/or 1638. Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults, on the circuit wiring, and shall be so arranged that a fault condition on any indicating appliance circuit or group of circuits will not cause an alarm to sound. The occurrence of any fault will light the General Trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition. The notification appliance (combination audio/visual units only) shall produce a peak sound output of 90dba or greater as measured in an anechoic chamber. The appliance shall be capable of meeting the candela requirements of the ADA. The appliance shall be polarized to allow for electrical supervision of the system wiring. The unit shall be provided with terminals with barriers for input/output wiring and be able to mount a single gang or double gang box or double workbox with the use of an adapter plate. The unit shall have an input voltage range of 19-30 volts.

D. Smoke Detectors

1. Smoke detectors shall be the Silent Knight model HFS-P or HFS-PT ceiling mounted, addressable photoelectric smoke detectors. The combination detector head and twist lock base shall be U.L. listed compatible with the Silent Knight 5600 fire alarm control panel. The base shall permit direct interchange with Silent Knight's HFS-T heat detector. The base shall be the appropriate twist lock base. The smoke detector shall have a flashing status LED for visual supervision. The detector may be reset by actuating the control panel's reset switch. The sensitivity of the detector shall be capable of being determined and measured by the control panel without the need for external test equipment. The vandal security-locking feature shall be used in those areas as indicated on the drawing. The locking feature shall be field selectable when required. It shall be possible to perform a sensitivity test of the detector without the need of generating smoke. Electronics of the unit shall be shielded to protect against false alarms from E.M.I. and R.F.I.

E. Heat Detectors

1. Furnish and install addressable heat detectors, Silent Knight model HFS-T. The combination heat detector and twist lock base shall be U.L. listed compatible with the Silent Knight 5600 fire alarm control panel. The base shall permit direct interchange with Silent Knight's HFS-P and HFS-PT photoelectric smoke detectors. The base shall be appropriate twist lock base. The heat detector shall have a flashing status LED for visual supervision. The detector may be reset by actuating the control panel's reset switch. The vandal security-locking feature shall be used in those areas as indicated on the drawings. Electronics of the unit shall be shielded to protect against false alarms

F. Duct Detectors

1. Duct Detector shall be Silent Knight Model HFS-D.

3.02 INSTALLER'S RESPONSIBILITIES

- A. The installer shall coordinate the installation of the fire alarm equipment.
- B. All conductors and wiring shall be installed according to the manufacturer's recommendations.
- C. It shall be the installer's responsibility to coordinate with the supplier, regarding the correct wiring procedures before installing any conduits or conductors.

3.03 INSTALLATION OF SYSTEM COMPONENTS

- A. System components shall be installed in accordance with the latest revisions of the appropriate NFPA pamphlets, the requirements contained herein, National Electrical Code, local and state regulations, the requirements of the fire department and other applicable authorities having jurisdiction (AHJ).
- B. All wire used on the fire alarm system shall be U.L. Listed as fire alarm protection signaling circuit cable per National Electrical Code, Articles 760.

3.04 FINAL TEST

- A. Before the installation shall be considered completed and acceptable by the awarding authority, a test of the system shall be performed as follows:
The contractor's job foreman, a representative of the owner, and the fire department shall operate every building fire alarm device to ensure proper operation and correct annunciation at the control panel.
- B. At least one half of all tests shall be performed on battery standby power.
- C. Where application of heat would destroy any detector, it may be manually activated.
- D. The communication loops and the indicating appliance circuits shall be opened in at least two (2) locations per circuit to check for the presence of correct supervision circuitry.

- E. The contractor shall leave the fire alarm system in proper working order, and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance by the awarding authority.

Prior to final test the fire department must be notified in accordance with local requirements.

3.05 AS BUILT DRAWINGS, TESTING, AND MAINTENANCE INSTRUCTIONS

A. As Built Drawings

- 1. A complete set of reproducible "as-built" drawings showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of the equipment shall be delivered to the owner upon completion of system.

B. Operating and Instruction Manuals

- 1. Operating and instruction manuals shall be submitted prior to testing of the system. Three (3) complete sets of operating and instruction manuals shall be delivered to the owner upon completion. User operating instructions shall be provided prominently displayed on a separate sheet located next to the control unit in accordance with U.L. Standard 864.

3.04 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials and leave all floors broom clean in areas affected by his work. Materials shall be disposed of in dumpsters provided by the General Contractor.

END OF SECTION

SECTION 28 31 43

FIRE DETECTION UNITS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. Provide all labor, materials, equipment, and services necessary for the complete installation of self-contained fire detection units, in accordance with NFPA standards, State Building Codes, and State and Local Fire Marshal requirements.
- B. Some items of work included are as follows:
 - 1. Self-contained multiple station fire detection units in all units.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Wiring: Section 26 05 19

1.04 SUBMITTALS

- A. This contractor shall submit shop drawings to the Architect for approval showing all components and wiring diagrams for a complete system.

PART 2 PRODUCTS

2.01 SELF-CONTAINED MULTIPLE STATION FIRE DETECTION UNITS

- A. Each dwelling unit shall be provided with an approved automatic household fire warning system. Unit shall be 120 volt, direct wired with battery backup and shall sense smoke and immediately sound an alarm. Unit shall have secondary contacts to allow interconnection with other detectors so that if one detector is actuated, all detectors in the unit go into alarm. Provide battery back-up as required by code. Unit shall be ESL, Notifier, Simplex, or BRK. (Photo-eye type.)
- B. For the purpose of installation and maintenance only, the applicable section of NFPA #72, National Fire Alarm Code shall be considered accepted engineering practice.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Fire detection units shall be installed within and outside bedrooms and on multiple levels as shown on the drawings and required by code.
- B. Units shall be interconnected so that if one unit goes into alarm then all units will sound an alarm.
- C. Wiring shall be as listed in Section 26 05 19. Units shall be 120 volt with battery back-up and shall connect to the adjacent bedroom circuits.

END OF SECTION

SECTION 31 22 00

EARTHWORK

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.
- B. The Subcontractor shall be solely responsible for complying with the federal, state, and local safety requirements, together with exercising precautions at all times for the protection of persons including residents, employees and the property. It is also the Subcontractor's responsibility to initiate, maintain and supervise all safety requirements, precautions and programs in connection with the work.

1.02 SECTION INCLUDES

- A. The work includes the furnishing of all labor, materials, equipment, and services necessary for the completion of all earthwork shown and hereinafter specified.
- B. Some items of work included, without limiting the generality of the word "extent" are as follows:
 - 1. Excavating, filling, backfilling and compacted fill as required to complete the project.
 - 2. Furnish and install any necessary bracing, cribbing, and the like to maintain proper cuts.
 - 3. Stock pile topsoil.
 - 4. Grade sub-base under all paving, curbs and walks.
 - 5. Rough grading.
 - 6. Finish grading.
 - 7. Erosion control and construction barricades as required.

1.03 RELATED SECTIONS

- A. Site layout work including such items as lines and grades for all streets, drives and parking areas and building corner points. (By Surveyor)
- B. Planting and landscaping. (Division 32)
- C. Excavation for grade beams and foundations. (Division 3)
- D. Excavation for all mechanical trades. (Division 22 & 23)
- E. Excavation for all electrical conduit runs, etc., by electrical contractor. (Division 26)

1.04 EXISTING CONDITIONS

- A. Contractor to visit site prior to bidding and assume full responsibility for visual observation of existing conditions.
- B. Contractor shall accept the site in the condition in which it exists at the time of the contract award to him.
- C. Check and verify existing grades and conditions during construction; report any discrepancies to Architect immediately.
- D. Contractor shall, before starting work, determine the location and elevation of all existing utilities whether shown on the plan or not.
- E. All utilities to be notified a minimum of 48 hours prior to beginning work.

PART 2 & 3 PRODUCTS & EXECUTION

3.01 DRAINAGE

- A. Reference the Soils Report (Reprint included in specs). All recommendations in the report are hereby made a part of the work.
- B. In general, all earthwork shall be done so that the work in progress and all completed work shall be well drained and free from water pockets.
- C. It shall be the contractor's responsibility to continuously and positively control all ground water and surface water by the use of ditches, pipes or pumping, until the permanent drainage system is completed.
- D. If ground water is encountered, construct drainage trenches and stabilize sub-grade with coarse crushed stone as directed by the soils engineer before starting controlled fill.
- E. The contractor shall abide by the recommendations of the soils engineer, but final methods of controlling site water shall be the responsibility of this contractor.

3.02 STRIPPING AND STOCKPILING TOPSOIL

- A. Remove to full depth all topsoil and any isolated zones of organic soil within all driveways, parking areas, and the entire area of the building plus an area five feet (5') wide around perimeter of the building or buildings.
- B. Strip topsoil only when moist or dry, not muddy. Keep topsoil free of subsoil, debris, stone over two (2) inches in least diameter, and other extraneous matter.
- C. Topsoil to be used for all finish grading.
- D. Topsoil shall be stock piled as close as possible to areas where it shall be redistributed. (Review locations with General Contractor prior to start of work.) All topsoil that cannot be stock piled in adjacent areas shall be stock piled on adjacent land owned by the Owner as agreed to and used as needed. Excess topsoil shall be left for future development. If topsoil is inadequate for finish grading additional topsoil may be obtained from the topsoil pile across the street and transported to the site.

3.03 GRADING

- A. The present and finished grade lines are shown on the drawings.
- B. All cutting, filling, backfilling, both interior and exterior, and grading necessary shall be done to bring the area to sub-grade levels.
- C. In general, grading should proceed as follows:
 - 1. Driveways and parking areas shall be graded to six inches (6") below the top of curb grade in cut areas until all utilities have been installed. In fill areas grades shall be brought to the subgrade shown on the plans and as described in the Soils Engineer's report. Final grading of streets and parking areas to subgrade shall be done immediately before placement of base course and proof rolled for necessary compaction with a smooth drum vibratory roller.
 - 2. Finish grading, including dressing swales, cleaning up excess footings, excavation of dressing terraces, excavation of driveways, etc., shall be done after construction of building is substantially complete.
 - 3. Finish grading shall include all grading necessary to prepare the site for sodding or seeding. All areas shall have top soil spread in thicknesses listed in landscaping section. Areas to receive sod shall be graded to 0.1 feet below finished grade shown on the plans.
 - 4. Mounding (as shown) is to be constructed of topsoil and any material designated as unacceptable for compaction area.
- D. Excess dirt left over after finish grading is to be left on adjacent land in areas designated by the Architect.
 - 1. Excess excavation from the utility trenches and footing excavation shall be set aside by the Utility Contractor for use as fill. The Earthwork Contractor shall move excavated material and build into the site in locations where needed.

3.04 EXCAVATION

- A. In general, excavation shall consist of the excavation of whatever substance encountered to the lines, grades and sections shown in the plans. This work shall include all excavations necessary for all drainage trenches and other similar features. All suitable materials removed in the excavation shall be used in the construction of embankments, subgrade shoulders, slopes and at such other places as directed by the Soils Engineer.
- B. Proof roll the sub base, excavate and repair any soft areas per the recommendations of the Soils Engineer. Remove any existing fill that is not acceptable to the Soils Engineer and recompact existing material as approved by Soils Engineer. Subgrade area shall be approved by the Soils Engineer prior to starting compaction work.
- C. All areas within building and paving areas where stumps and root systems are removed shall be filled with suitable compacted material.
- D. All excavation work shall be inspected and approved by the Architect before proceeding with construction. No excavation for foundations shall be done until the placement of all fill up to the proposed slab subgrade elevations is complete.

- E. This contractor shall maintain and keep ditches open and free of water, soil, debris and leaves. Ditches shall be finished on neat, regular lines conforming to the section and contours shown on the plans.

3.05 COMPACTED FILL

- A. After vegetable matter, topsoil, trees, shrubs, etc., have been removed from the surface upon which the fill is to be placed, the area shall be proof rolled and any soft pockets recompacted prior to commencement of fill operations. The surface shall then be plowed or scarified to a depth of at least six inches (6") or until surface is free from ruts or other uneven features which would prevent uniform compaction.
 - 1. Proof rolling shall be with equipment suitable to the inspecting Soils Engineer, minimum two (2) ton loaded dump truck.
 - 2. Any areas where tree roots have been removed shall be refilled and compacted with site soil.
- B. Materials for fill shall consist of materials approved by the Soils Engineer and shall be free from vegetable matter and other deleterious substances and shall not contain rocks or lumps having a diameter of more than six inches (6").
- C. No fill material shall be placed, spread, or rolled when it is frozen, thawing, or during excessively wet weather conditions. When work is interrupted by the excessive wet weather, operations shall not be resumed until the Soils Engineer indicates that the moisture content and density of the previously placed fill are as specified.
- D. Place fill at moisture content within three percent (3%) of optimum and compact in shallow, less than eight inch (8") lifts. Fill shall be compacted as listed in the Soils Report.
- E. Compaction of each layer shall be continuous over its entire area with suitable compaction equipment which shall make sufficient trips to insure that the required density has been obtained.
- F. The selected material shall be placed in level uniform layers. Each layer shall be thoroughly blade mixed during the spreading to insure uniformity of material in each layer. The maximum size rock acceptable shall be six inches (6"). No large rocks shall be allowed to nest and voids must be carefully filled with small stones or earth, properly compacted. No large rocks will be permitted within twelve inches (12") of the finished grade.

3.06 TESTS AND SUPERVISION

- A. Field density tests shall be made by the Soils Engineer of the compaction of each layer of fill. Density tests shall be taken in the compacted materials below the disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below the required density, the particular layer or portion shall be reworked until the required density has been obtained. Sufficient density tests shall be made to support the Soils Engineer's certification of each layer.

- B. A recognized Soils Engineer will be required to supervise all fill and compaction work to insure that the Plans and Specifications are carried out. The Soils Engineer shall certify that the minimum densities specified are met on each area before any concrete or paving work is started. The general contractor shall pay for all compaction tests and engineering services that are required.
- C. Soils Engineer will forward copies of all tests and certificates of compaction to the Architect and the Contractor.

3.07 PROTECTION, DAMAGE AND RESTORATION

- A. Protect existing installation not to be disturbed or removed from damage during conduct of work.
- B. Property damaged by any activities related to work to be restored to original or equal condition.
- C. Take adequate precautions to avoid settlement, eroding, silting, or other damage to properties lower than site.
- D. Maintain all bench marks and other permanent reference points within area of work. Replace any such marking that is disturbed, destroyed, or moved during construction. Bench marks to be replaced in the original location at finished grade elevation. Furnish a certificate of a registered surveyor that all such items have been accurately relocated.

3.08 CLEAN UP

- A. Keep all streets, roads, and drives used for hauling free of mud and debris throughout construction operations.

END OF SECTION

SECTION 31 31 00

SOIL TREATMENT

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. The work includes the furnishing of all labor, materials, equipment and services necessary for and reasonably incidental to the completion of all soil treatment work shown and hereinafter specified.

1.03 GUARANTEE

- A. Exterminator shall provide a warranty of his work for a period of five (5) years covering repair and replacement of termite damage if necessary, and retreatment of infested areas.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Soil poison shall be Termidor SC in a .06% concentration, or Dursban T.C. in a 1% concentration, all applied in a water emulsion. Verification of material used and evidence of purchase shall be provided to the General Contractor. The General Contractor and Owner reserve the right to request an onsite sample for testing to insure accuracy of concentration. This testing shall occur at least three times during the construction of the project.

PART 3 INSTALLATION

3.01 APPLICATION

- A. Ground poisoning shall be performed by a licensed professional. All work shall be in accordance with good practice requirements. Foundation soil should not be treated when excessively wet or after heavy rains, to avoid movement of the poisonous chemicals from the treated site. Unless the treated areas are to be immediately covered, precautions should be taken to prevent disturbance of the treatment.
- B. For slab on ground construction apply at the rate of **one gallon per ten square feet**. Immediately cover with visqueen vapor barrier. If not covered within 24 hours, area shall be retreated.
- C. For foundations, treat at the rate of four (4) gallons per ten lineal feet per one foot of depth. Treat soil immediately outside footings around the perimeter of the building. Footings to be covered or poured within 24 hours.

- D. Patios and stoops to be treated same as slab on grade, one gallon per ten square feet, immediately prior to pouring slab. If not poured or covered within 24 hours, the area shall be retreated.
- E. After final grading, landscaping, etc. are complete, the grade around the perimeter of the building shall be treated by power injection into drilled holes at 8" o.c.
- F. All work shall conform to Bulletin #64 (USDA Home & Garden).

END OF SECTION

SECTION 32 12 00

FLEXIBLE PAVING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.
- B. The Contractor shall be solely responsible for complying with the federal, state and local safety requirements, together with exercising precautions at all times for the protection of persons including residents, employees and the property. It is also the Contractor's responsibility to initiate, maintain and supervise all safety requirements, precautions and programs in connection with the work.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services necessary to complete all paving work as shown on the drawings and specified hereinafter for the apartment project, including sealing and striping of parking spaces (color by Architect).

1.03 RELATED SECTIONS

- A. Preparation of sub-base (Section 31 22 00)
- B. Concrete pavement (Section 32 16 00)

PART 2 PRODUCTS

2.05 MATERIALS (ASPHALT)

- A. Aggregate base within the project shall be spread to a thickness of 8" in drives and 6" in parking areas as shown on drawings. As a basis of design the granular base shall be Item 304, State of Ohio Department of Highways Construction and Materials Specifications, or material meeting Gradation listed and shall be crushed stone, crushed or uncrushed gravel, slag, sand, stone, or slag screening, mineral filler, of a combination of two or more of these materials. Gradation of aggregate shall be as follows:

<u>Sieve</u>	<u>Total Passing % by Weight</u>
2 inch	100
1 inch	70-90
3/4 inch	50-85
No. 4	25-60
No. 40	7-30
No. 200	0-15

- B. As a basis for design the Intermediate course within the project shall be spread 2" thick and shall be Item 442 Type 1, State of Ohio Department of Highways Construction and Materials Specifications, or material meeting Gradation listed and shall be a plant mix of aggregate and asphalt cement. Gradation of aggregate shall be as follows:

<u>Sieve</u>	<u>Total Passing % by Weight</u>
1 inch	100
3/4 inch	90-100
1/2 inch	65-90
No. 4	35-65
No. 16	15-45
No. 50	3-22
No. 200	0-8

- C. Tack coat within the project shall be Item 407 Bituminous Material 702.02, RC-70, RC-250, or 702.04, RS-1, RS-2, or MS-2.

- D. As a basis for design the surface course within the project shall be spread 1/2" thick and shall be Item 441 Type 1, State of Ohio Department of Highways Construction and Materials Specifications, or material meeting Gradation listed shall be a plant mix of aggregate and asphalt cement. Gradation of aggregate shall be as follows:

<u>Sieve</u>	<u>Total Passing % of Weight</u>
1/2 inch	100
3/8 inch	90-100
No. 4	45-75
No. 16	15-45
No. 50	3-22
No. 200	0-8

Bitumen content shall be 4.5 - 9.5% of total mix. Bitumen shall comply with AASHTO Spec. M226 for the applications shown.

- E. Sealer for asphaltic pavement shall be Masterseal II by Seal Master Industries or approved equal. Sealer shall be an asphalt based emulsion meeting ASTM D-2939, ASSHTO-7-44, ASTM D-217 and Federal Spec TCC-5588.
- F. Marking paint for striping shall be single coat Sherwin Williams A-100 Acrylic Exterior Latex Flat Paint, A6 Series, Color white.

PART 3 INSTALLATION

3.01 ASPHALT PAVING

- A. Base course, intermediate course and surface course within the apartment project shall be as specified herein. All material shall be applied with a self-propelled spreading machine with an automatic screed control system which maintains the screed or strike-off in a constant position relative to profile and cross slope.

- B. The area to be paved shall be substantially true to line and grade. It shall have a dry, firm and properly prepared surface before paving operations begin. All loose and foreign material shall be removed.
- C. Base course shall be spread true to line and grade and shall be by means of an approved, self-propelled spreading machine without damage to the subbase. Material shall contain sufficient moisture at time of loading to minimize segregation.
1. Compaction of base course shall be obtained with a roller of sufficient weight to produce a finished density equal to 4,000 pounds per cubic yard for gravel or stone and 3,000 pounds for slag. Moisture may be added at the job site in order to aid compaction.
- D. Intermediate and Surface Course
1. Asphaltic concrete intermediate and surface course shall be transported to the site in trucks equipped to maintain temperature. Temperature of the material at the job site shall be not less than 250 degrees F.
 2. Spreading shall be by machine and shall be neat with a minimum number of joints.
 3. Intermediate course shall be Item 402 and surface course shall be Item 404 (thickness shown on drawings). Placing the mixture shall be a continuous operation. If any irregularities occur, they shall be corrected before final compaction of the mixture.
 4. **Apply tack coat between intermediate and surface course** at a rate of 0.1 gallons/square yard. If intermediate course and surface course are applied as part of one paving operation the tack coat may be eliminated.
 5. The mix shall be compacted immediately after placing. Initial rolling with a steel wheeled tandem roller, steel three wheeled roller, vibratory roller, or a pneumatic tired roller shall follow the paver as closely as possible. If needed, intermediate rolling with a pneumatic tired roller shall be done immediately behind the initial rolling. Final rolling shall eliminate marks from the roller. A vibrating plate compactor or a hand tamper shall be used to achieve thorough compaction. Minimum roller weight shall be eight (8) tons.
 6. Paving shall be checked for areas ponding water prior to placing of top coat. Any low areas ponding water or not draining correctly shall be corrected prior to placing surface course.
 7. The surface of the completed pavement will be checked longitudinally and transversely for smoothness with a ten foot (10') straight edge. The surface shall not vary more than 1/8" in ten feet (10') parallel to the centerline and more than 1/4" at right angles to the centerline.
- E. Sealer:
1. Sealer as specified under Materials shall be applied to all parking areas in accordance with the manufacturer's recommendations. Installation shall be made no sooner than 3 months after installation of final coat of asphalt.

2. Provide an alternate price to the General Contractor to seal all paving. (Parking, drives and driveways).

F. Striping

1. Stripe all parking stalls, including handicapped, as shown on drawings and in accordance with ADA Standards.

3.02 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from this work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property.

END OF SECTION

SECTION 32 16 00

SITE CONCRETE

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services for all site concrete.
- B. Some items of work included, without limiting the extent are as follows:
 - 1. Provide laboratory design testing and services.
 - 2. Provide layout for curbs, walks, aprons, etc. using corner and grade stakes provided by Surveyor.
 - 3. Provide excavation and grading as required.
 - 4. Provide ADA textured pads as shown and required at bottom of all ramps.

1.03 RELATED SECTIONS

- A. Site layout by Surveyor
- B. Building foundations, grade beams and slabs: Section 03 31 00
- C. Concrete for site lights is by the Electrical Contractor

1.04 QUALITY ASSURANCE

- A. All concrete shall be ready mixed. Except as may be modified herein, concrete work including, but not limited to, materials, proportioning, mixing, placing, curing, form stripping, and testing shall conform to the requirements of (current edition):
 - 1. ACI 301, "Specifications for Structural Concrete for Buildings", as modified and supplemented herein.
 - 2. ACI 318, "Building Code Requirements for Reinforced Concrete".
 - 3. ACI 347, "Recommended Practice for Concrete Formwork".
 - 4. Building Code and regulations of authorities having jurisdiction.
 - 5. Details of concrete reinforcement and accessories not covered herein shall be in accordance with ACI Manual SP-66.

1.05 SUBMITTALS

- A. Submit for review, prior to delivery of concrete, copies of proposed design mixes, including proportions and water/cement ratio and test reports for mixes made within the last twelve (12) months.
- B. Submit manufacturer's product literature and test data for all proposed admixes, curing compounds, etc. being used on the project.

PART 2 PRODUCTS

2.01 GENERAL

- A. Concrete work shall conform to all requirements of ACI 301, "Specifications for Structural Concrete of Buildings", except as modified by the following supplemental requirements. The supplemental requirements are keyed to section numbers of ACI 301.

2.2 Admixtures required are indicated in the concrete mix proportions. The contractor shall receive written approval from the Architect/Engineer before using admixtures.

3.1.1 The contractor shall submit the design mixes and all supporting data for approval as soon as possible after the award of the contract.

3.2 Concrete for the different structural elements of the project shall have the following strengths:

<u>Mix Class</u>	<u>fc</u>
(A1) Exposed underfloor slabs, walks drives, etc.	4500
(A2) Exposed concrete with primary vertical surfaces, such as walls, curbs, etc. Masonry wall fill (6 – 8" slump)	4500

3.4.1 All class (A) concrete shall meet the durability requirements of 3.4.1.

3.7.1 Calcium chloride shall not be used without written permission from the Architect or Engineer.

3.7.4 All class (A) concrete mixes shall use air entraining admixture. Water reducing admixture can be used at the contractor's option. The manufacture and quantity shall be included in the mix design. An approved accelerator may be used when the concrete temperature is less than 40 degrees F. Calcium chloride shall not be used in quantities exceeding 1% of the weight of the cement, and calcium chloride shall not be used where aluminum conduit, couplings, or accessories are embedded in the concrete without adequate corrosion protection for the embedded items. A water reducing retarder must be used in the proportions recommended by the manufacturer when the temperature of the concrete as placed exceeds 65 degrees.

5.1.3 Visual method of identification in field of bar strengths shall be shown on shop drawings and be according to C.R.S.I. manual of standard practice.

- 5.1.4 When requested, furnish copies of certificates of mill tests, covering all bars, mesh and wire used, or copies of test reports made by an independent testing laboratory acceptable to the Architect, showing conformance of the materials with specification requirements.
- 5.2.1 All #2 and #3 bars shall be grade 40. All other reinforcement shall be grade 60.
- 7.1.1 Delivery tickets shall show the following:
1. Batch number.
 2. Mix by class and cement content with maximum size aggregate.
 3. Admixture.
 4. Air Content.
 5. Slump.
 6. Time of loading.
 7. If any water is added to the mix on the job, it must be approved by the Architect's representative and delivery ticket noted with the amount of water and signed by the representative of the Architect.
- 8.3.1 All concrete shall be discharged at the job within 1-1/2 hours after water has been added to the cement and aggregates, or cement batched with the aggregates, unless a longer time is specifically authorized by the Architect; during hot weather, and also under other conditions contributing to quick stiffening of concrete, or when the high early strength cement is being used, the Architect may require a reduction in this elapsed time.
- 11.5.2 Location of control joints in exterior slabs shall be located as shown on plans.
- Provide bond breaker with roofing felt at junction of walls, bases, columns, etc. Provide 1/2" expansion joints at changes in direction of slabs or abrupt changes in width and not greater than twenty feet (20') apart on slabs without control joints.
- Sidewalks shall have control joints 7/8" deep and spaced 4'-0" to 6'-0" center to center (depending upon the width of the walk). Tool all joint edges. Construction joints in walks required at maximum of thirty feet (30').
- 11.7 Provide the following exterior slab finishes:
- Exterior stairs, sidewalks, patios and stoops: Slab shall receive troweled and edged finish to seal top, then broom finished per 11.7.3.
- Trowel finish surface then edge the perimeter & score the walk sections. Broom finish the area & then edge and score the finished walk so that there is a "smooth" edge & scoring strip with the remainder a light broom finish.
- 11.9 All exterior slabs shall have a class B tolerance.

- 12.2 When concrete above grade is placed in the open and the temperature exceeds 80 degrees F. the curing method for the first 24 hours shall be by methods as described in Section 12.2.1.1, 12.2.1.2, or 12.2.1.3.
- 16.2.1 The services of sections 16.3, 16.4, and 16.5 shall be paid for by the contractor.
- 16.2.2 The necessary testing services of sections 16.3, 16.4, 16.5, 16.6, and 16.7 shall be performed by a testing agency acceptable to the Architect/Engineer at the contractor's expense.
- 16.3.4.4 Concrete strength tests will be required during the progress of the project as follows:
 - a. Make strength tests on each pour of concrete. If more than one pour is made in one day from the same supplier only one test is required. Pours of less than one truckload need not be tested. Check slump prior to pouring. All incorrect slump concrete shall be rejected for use in the work.
 - b. The exact location of the concrete in the work represented by each set of cylinders must be recorded and shown on the test reports. Provide an insulated moist box for protection of the cylinders until shipped to the laboratory.
 - c. Mold three specimens from each sample in accordance with the method of making and curing concrete compression and flexure specimens in the field (ASTM C51). Test one specimen at seven (7) days and test two specimens at twenty-eight (28) days in accordance with ASTM C39.
- B. Expansion joint material shall be non-extruding and resilient filler, conforming to ASTM Specification D1751. Filler may be composed of either cellular fibers or granulated cork with asphalt binder. Acceptable fillers: "Elastite" by Philip Carey Company; "Flexcell" by Celotex Corporation; "Corkfill" or "Fiber Joint" by W. R. Meadows. (1) Temporary Wood Fillers: Straight, sound strips in lengths to permit jointing where shown only. To be of width and depth indicated, and tapered slightly from face to back. Coat with paraffin or equivalent, to seal against moisture and promote ready removal with forms. Must produce true, straight, joint edges.

2.02 UNDERSLAB GRANULAR FILL

- A. Granular fill under concrete slabs as shown on drawings.
- B. Granular fill shall consist of gravel or crushed gravel with not more than 10% fines (passing #299 sieve) and no stones larger than 1".
- C. All underslab trades shall be finished and have work inspected and approved before granular fill work is started. Granular fill shall be laid and raked level just before concrete work is to start.
- D. Contractor may at his option submit for approval by the Architect other material for underslabs granular fill. If required, this contractor shall submit samples to a recognized Soils Engineer for testing and further approval.

PART 3 EXECUTION

3.01 GENERAL

- A. All concrete work shall be installed in accordance with ACI-301, applicable codes listed previously, all state and local codes, and in a general good workmanship manner.

3.02 HOT WEATHER PROTECTION

- A. Hot weather concreting shall conform to ACI 305R (current edition), ACI "Recommended Practice for Hot Weather Concreting" and these Specifications.
- B. Hot weather concreting:
 - 1. In extremely hot weather, and with use of relatively hot materials, the temperature of concrete may be excessive. In no case will the use of concrete having a temperature in excess of 90 degrees F. be permitted. Cooling of water and/or aggregates will be required if concrete temperatures rise above this limit.
 - 2. Sprinkle forms, reinforcing steel and subgrade with cool water just before concrete is placed.
 - 3. Avoid prolonged mixing. Transport and place as quickly as practicable.
 - 4. Begin curing immediately after finishing using a method suitable for weather conditions and type of work. Continuous moist curing is required when air temperature at site is above 80 degrees F.

3.03 COLD WEATHER PROTECTION

- A. Winter concreting shall conform to ACI 306R (current edition), ACI "Recommended Practice for Cold Weather Concreting" and these Specifications.
- B. Protection: Unless adequate protection is provided and/or approval is obtained, concrete shall not be placed during rain, sleet, or snow.
- C. Concrete shall not be placed in forms or on grade which has been frozen unless all ground, forms, and reinforcing have been covered and heated for 24 hours prior to placing of concrete.
- D. To maintain the temperature of the concrete above the minimum placing temperature required the admixed temperature shall be not less than 55 degrees F. when the mean temperature falls below 40 degrees F.
- E. If water or aggregate has been heated, the water shall be combined with the aggregate in the mixer before cement is added. Cement shall not be added to mixtures of water and aggregate when the temperature of the mixture is greater than 100 degrees F.

3.04 EXCAVATION

- A. The concrete contractor shall excavate for all walks, curbs, stoops, patios, etc. Excavation shall be from finished subgrade to depths as shown on the drawings.

3.05 FORM WORK

- A. Construct forms to permit easy removal without damage to concrete and to withstand all vertical and lateral loads of fresh concrete, external and internal vibration, wind loads and other vertical and lateral loads that might be applied until such loads can be supported by the concrete structure.
- B. Conform to line, level, grade, shape, size, and position shown and shore or truss forms adequately to produce concrete which is true to dimensions and elevations shown on drawings within allowable tolerances listed in ACI 301, Table 4.3.1.
- C. Clean the forms so that they are free of paper, sawdust, dirt and debris when concrete is placed.
- D. Provide sufficient forms so that work can be carried out without delay of project. Maintain forms so as to eliminate formation of joints in concrete due to shrinkage of lumber.

3.06 REINFORCING STEEL

- A. Set chairs and accessories to secure reinforcing adequately. Support reinforcement for concrete to be placed on the ground with stands. Supports shall be adequate to prevent displacement of reinforcing during pouring operations. All installation work shall be in accordance with CRSI publications for "Placing of Reinforcing Bars", current edition.
- B. Space, support, hold and fasten reinforcement and dowels with required and approved ties, clips, and accessories to prevent displacement beyond permitted tolerances before and during placing of concrete. Check reinforcement as placed just before and during casting of concrete. Immediately correct displacement and provide additional supports to prevent recurrence.
- C. Tie the bars and bar supports together with 16 gauge wire. Set wire ties so that ends are directed into the concrete, not toward exposed concrete surfaces.
- D. Protect reinforcement by thickness of concrete shown in details on drawings. Place reinforcing bars to comply with details on drawings and with ACI-318, Chapter 7.
- E. Where typical splices are acceptable, provide standard reinforcement splices by lapping the ends, placing bars in contact and tightly wire tying. Lap the corners and approved splices in typical continuous reinforcing a minimum of 43 bar diameters.
- F. Install wire mesh in any areas shown on drawings. Provide wire mesh in all sidewalks.

3.07 PLACING CONCRETE

- A. Before placing concrete, remove all debris, water, etc. from the reinforcement and areas to be occupied by concrete.
- B. Obtain approval for subgrade bearing and reinforcement.

- C. Any areas where inadequate bearing is found shall be further excavated until satisfactory subgrade is established. The Soils Engineer shall be consulted for specific procedures in this case, as to whether compacted fill, gravel, lean concrete, or regular concrete shall be used.
- D. Placing
 - 1. Follow recommended procedures of ACI-304 for placing concrete.
 - 2. Handle concrete rapidly from mixer to forms, and deposit as nearly as possible in its final position to avoid segregation.
 - 3. Do not deposit concrete that has partially hardened or been contaminated by foreign material. Do not use retempered concrete.
 - 4. Place concrete upon clean, well thawed, damp surfaces, free from water, and never upon soft mud or dry porous earth.
 - 5. Use of chutes shall be subject to approval.
 - 6. Place concrete in horizontal layers, and stamp and spade well.
 - 7. Place concrete at such a rate that surfaces of concrete which have not reached joint level will not have received initial set before additional concrete is place thereon.
 - 8. Do not drop concrete over a distance of five feet (5') in height without use of tremie.
 - 9. Care shall be taken to finish the floors level at all toilet and bathtub locations. Review locations based on plumbing rough-in.

3.08 CURING

- A. Protect freshly deposited concrete from premature drying and excessively hot or cold temperatures and maintain with minimal moisture loss at a relatively constant temperature for the period of time necessary for hydration of cement and proper hardening of concrete.
- B. Keep forms wet in hot weather during the curing period. If forms are removed during the final curing period, complete the curing by keeping concrete surfaces wet.
- C. At end of final curing period remove curing materials and sweep or clean.
- D. Prevent rapid drying at end of the curing period.
- E. Keep curing methods and procedures for exposed concrete walls consistent throughout the work to ensure a reasonable color match.

3.09 PROTECTION

- A. During construction operations use temporary planks or plywood on slabs at points of heavy traffic where completed surfaces are to remain permanently exposed.

- B. Protect concrete surfaces to remain permanently exposed from the placing of other concrete, mortar and cleaning of floor slabs and other construction, from spillage or careless application of wall board, compounds, cementitious and bituminous materials, and from scarring, rusting or damage by construction operations. Use nonstaining paper and plywood or other method suitable for the hazards.

3.10 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property and leave all floor broom clean in areas affected by his work.

END OF SECTION

SECTION 32 91 00

TOPSOIL

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment and services for redistributing all topsoil work as shown on the drawings and specified hereinafter.
- B. Some items of work included, without limiting the generality of the word "extent" are as follows:
 - 1. Spread topsoil in all areas disturbed during construction, requiring sod, seed and plantings as shown on drawings.
 - 2. Remove debris and unusable soil, etc. and dispose of on site or on adjacent land owned by the Owner and clean all streets, drives, walks, etc. of soil as required. Review with Architect in field.

1.03 RELATED SECTIONS

- A. Stockpiling of Topsoil: Excavation and Grading
- B. Lawns & Grasses: Section 32 92 00
- C. Trees, Plants and Ground Covers: Section 32 93 00
- D. Hand raking and rock removal are by the Landscape Contractor.

1.04 QUALITY ASSURANCE

- A. Obtain final approval of grade and surface condition from the Architect after completion of work.
- B. Make random test holes to verify thickness of topsoil. Areas found lacking shall be reworked until acceptable.
- C. Topsoil to be reasonably free of subsoil, clay bumps, brush, weeds and litter, and free of roots, slumps, stones larger than 2" in any dimension, and other extraneous or toxic matter harmful to plant growth.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Original topsoil stripped from the site and stockpiled for later placement as required.
- B. If topsoil located onsite is inadequate topsoil from the pile across the street may be used.

PART 3 EXECUTION

3.01 PREPARATION FOR TOPSOILING

- A. Scarify the rough grade by discing or harrowing if required.
- B. Do not place topsoil when either the subgrade or topsoil is wet or frozen enough to cause clodding.

3.02 SPREADING AND CONDITIONING TOPSOIL

- A. Uniformly distribute the on-site topsoil from stockpiles over site areas designated to receive seed or sod or planting. Fill against curbs and walks.
- B. Break up clods and work the top three inches (3") of soil into a smooth, loose, friable satisfactory seed bed by discing or by using cultipackers, rollers, drags, harrows, or other equipment and shape to the required grade with a maximum tolerance of 0.1 foot.
- C. Over existing sparsely sodded, weedy, barren, unworked and packed or hard areas first cut and dispose of grass and weeds, then scarify, loosen and work the soil to a depth of at least 5". Take care not to damage feeder root systems of remaining trees.

END OF SECTION

SECTION 32 92 00

LAWNS & GRASSES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment, and services necessary for the completion of all lawns and grasses as shown on the drawings and herein specified.

1.03 RELATED SECTIONS

- A. Topsoil Work: Section 32 91 00
- B. Grading: Division 31

1.04 QUALITY ASSURANCE

- A. Sod shall be uniformly cultivated and free from weeds and tall grasses.

1.05 GUARANTEE AND REPLACEMENT

- A. The life and satisfactory condition of lawn shall be guaranteed by the subcontractor through one complete growing season, and dormant period, after which it shall be firmly rooted and in vigorous growing condition or be replaced. This shall be an unconditional guarantee and the contractor shall replace, free of charge, any materials which die during this period, under the same conditions as described before. At the end of the guarantee period any material not showing definite and satisfactory life and growth shall be replaced.

PART 2 PRODUCTS

2.01 SODDING

- A. Lawn sod shall be sown and maintained as nursery sod crop prior to harvesting. Sod shall have sufficient strength to support its own weight and to permit handling and be of sufficient density so that no soil is visible when the turf is cut to a height of one and one half inches (1-1/2"). Maximum mowing height at time of harvest shall be two and one half inches (2-1/2"). Sod shall not be harvested or transplanted during either excessively wet or dry conditions.
- B. Sod shall be Kentucky Bluegrass or similar as approved by Architect.
- C. Sod shall be cut from 1-1/4" to 1-3/4" thick, in strips with straight sides and square ends, preferably 15" wide and from 36" to 60" long.

2.02 SEEDING

- A. All areas indicated on the drawings as "seed" shall be seeded in accordance with this Specification.
- B. Lawn seed shall contain 40% Kentucky Bluegrass, 20% Creeping Red Fescue, 20% Express Perennial Ryegrass, and 20% Imagine Perennial Ryegrass at a sufficient rate to insure a proper grass cover at time of germination. Seed mixture shall be spread on a still dry day, at the rate of three (3) pounds per 1,000 sq. ft. with a mechanical seeder or hydraulically.
- C. Fertilizer to be standard commercial mix of 5-10-5 grade, 5% nitrogen, 10% phosphoric acid, 5% potash.
- D. Soil to be tested to determine whether soil amendments are needed and individual rates of application.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. The operation of sod laying shall not be performed when ground is frozen or muddy or when soil or weather conditions would prevent the proper soil preparation and subsequent operations as specified.
- B. Seasonal Limits: Sodding shall be done between March 15 through November 15, except as otherwise authorized by the Architect and with the consent of the General Contractor and Owner. No sodding shall be done in frozen soils or during unfavorable weather conditions. No sod shall be used if it remains on top of the ground over four days.

3.02 PREPARATION FOR SOD

- A. Lawn Sodding: Areas to be sodded shall be raked to provide a clean, rock free even surface slightly below the approved finish grade. Where the soil is dry, it shall be thoroughly dampened the night before the sod is laid.
- B. Topsoil shall be provided and spread by the topsoil contractor and fine graded by the landscaping contractor. This subcontractor shall remove all roots, rocks debris etc. and break up all clods by "rock hound" or other acceptable method approved by the Architect.

3.03 INSTALLATION OF SOD

- A. Sod shall be laid horizontal with the slope (paralleling the contours), starting at the bottom.
- B. Joints shall be tight and the sod immediately tamped or rolled in place. If the sodded surface is still rough and has open joints, it shall be leveled by the addition of at least 75 cubic yards of topsoil per acre spread by hand. The unsodded area shall be seeded and rolled.
- C. On steep slopes the sod shall be securely pegged with 1-1/2" square pegs one foot long, driven flush with the top of the sod and spaced two feet on center.

3.04 CARE AND MAINTENANCE OF SOD

- A. The sodding shall be watered as soon as it is in place and then lightly tamped or rolled. Any permits to use fire hydrants and equipment needed shall be the responsibility of the General Contractor.

- B. Once sod installation is complete in each area all watering and mowing shall be the responsibility of the General Contractor.

3.05 PREPARATION FOR SEED

- A. Undisturbed areas that are to be seeded shall be plowed so that existing weeds or vegetation is turned over. Areas shall then be fine graded and seeded as listed above.
- B. Topsoil shall be spread by topsoil contractor and fine graded by the landscape contractor. This subcontractor shall remove all roots, rocks, debris etc. and break up all clods by "rock hound" or other acceptable method approved by the Architect.
- C. Before spreading seed apply fertilizer.
- D. The soil shall then be reworked until pulverized and until amendments and fertilizer have been incorporated to a depth of two (2) inches.

3.06 INSTALLATION OF SEED

- A. Contractor may vary method of seeding on his own responsibility to establish a uniform turf in areas specified. Seeding shall not be performed until after planting of all trees and shrubs.
- B. Immediately after sowing, the area shall be raked to a depth of approximately 1/4".
- C. Within 48 hours after seeding clean straw mulch shall be evenly placed over all seeded areas at the rate of approximately two to three tons per acre.
- D. Seed may be spread by use of hydroseed method. Submit mix to Architect for approval.

3.03 CARE AND MAINTENANCE OF SEED

- A. Seeded areas shall be watered initially by the Landscape Contractor. After the initial watering, all watering shall be by the General Contractor. Seeded areas shall have all straw removed, grass mowed and then inspected by the Architect for acceptance.
- B. Any bare or thin areas shall be reseeded. Preparation is to be the same as initial installation. Areas are to be maintained until filled in, and until accepted by the Architect.

3.08 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and, as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property. Particular attention is to be paid to cleaning up piles of stone, dirt, and clods which result from fine grading and raking. Sidewalks and paved areas are to be hosed down and left clear.

END OF SECTION

SECTION 32 93 00

TREES, PLANTS AND GROUND COVERS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Reference is made to the instructions to Bidders, General Conditions, Supplementary Conditions, and other Division 1 Specifications section requirements which apply to work specified in this section.

1.02 SECTION INCLUDES

- A. All labor, materials, equipment, and services necessary for the completion of all landscape, mulch and gravel work as shown on the drawings and herein specified.
- B. Prior to commencement of installation of planting, mulching and gravel around each type of building the subcontractor shall meet with the Architect in the field to review all concerns relating to placement, spacing, etc. in order to resolve problems or conflicts prior to start of work.

1.03 RELATED SECTIONS

- A. Topsoil Work: Section 32 91 00
- B. Grading: Division 31

1.04 QUALITY ASSURANCE

- A. Plant Materials: All nursery stock shall have been inspected and certified by the State Division of Plant Industry, Section of Insect and Plant Disease Control. All plants supplied shall conform to the names given on both the plan and the plant list and shall conform to the nomenclature as listed in the latest edition of "Standardized Plant Names", American Joint Committee on Horticultural Nomenclature.
- B. Quality of Plants: Plants shall have a habit of growth that is normal for the species and shall be sound, healthy, and free from diseases, insect pests, mechanical injuries, defects, disfiguring knots, abrasions of the bark and sun scald injuries. Plants shall be straight and plumb in their natural position and shall be heavily and well branched. During the appropriate season, plants shall exhibit healthy and full foliage.
- C. All plants shall be nursery grown from stock that has proven hardy to the location of this project. Plants shall have been growing under similar climatic conditions as this project.
- D. Size of plant material: Plant size, grading standards and methods of measurement shall conform to those of the American Standard for Nursery Stock ANSi Z-60.i, by The American Association of Nurserymen. The minimum acceptable sizes of plants, measured before pruning shall conform to measurements specified in the plant list. Height and spread specified refer to the main body of the plant and not the distance from tip to tip of branches or roots. Plants larger in size than specified may be used with the approval of the Architect, but use of such plants shall not increase the contract price. If the use of larger plants is approved, the spread of roots or ball of earth shall be increased in proportion to the size of the plant. Up to 10% of undersize plants in any one variety or

grade may be used, provided there are sufficient plants above size to make the average equal to or above specified grade and provided undersize plants are larger than the

TREES, PLANTS & GROUND COVERS

32 93 00-1

average size of the next smaller grade.

1.05 SUBSTITUTIONS

- A. This subcontractor shall furnish and plant all plants as specified on the Plans. No substitutions of plants, sizes, quantities or root conditions will be accepted, except with the approval of the Architect. In any case, where a substitution is needed, the subcontractor must submit request in writing to the Architect for approval. Proposed substitutes in each case must possess the same essential characteristics as the kind of plant actually specified, in regard to appearance, ultimate height, shape, habit of growth, general soil and any other requirements. In no case shall the average cost and value of the substituted plants be less than the cost and value of plants actually specified. Plants of greater value may be accepted without additional cost to the Owner.

1.06 DELIVERY AND STORAGE

- A. Architect reserves the right to reject plant material that does not conform to the above stated standards. All rejected material shall be immediately removed from the site and replaced with acceptable material at the subcontractor's expense.
- B. Plants shall be appropriately covered when transported to site.
- C. Plants not installed immediately upon their arrival at the site must be stored in the proper manner as follows: balled and burlapped plants must be buried in a trench which allows contact of roots to soil or mulch. Bare roots must be covered with a layer of mulch. All plants shall be protected from wind and excessive sun by the use of moist burlap or other such banners. Roots shall never be exposed to freezing, excessive heat or harsh winds. Bare root, balled and burlapped and container plants shall be kept moist but never water logged. During storage periods of more than one week, container and balled and burlapped plants shall be covered with mulch.
- D. Balled and burlapped plants: Designated B+B in the list of required plants, shall be adequately balled with firm natural balls of soil in sizes as set forth in USA Standard for Nursery Stock. Firmly wrap balls with burlap or substitute approved cloth.

1.07 EXISTING CONDITIONS

- A. It shall be the contractor's responsibility to locate and protect above and below ground utilities.
- B. The subcontractor shall be responsible for the protection of crowns, trunks and roots of existing trees, shrubs, lawns, paved areas and other existing landscaped areas that are to remain.
- C. Existing trees which may be subject to construction shall be boxed, fenced or otherwise protected before work is started. Boxing or other protection will be removed at the end of construction. Do not locate heavy equipment or stockpiles within the drip line of existing plants.
- D. Any damage to utilities, structures, planting or lawns which results from the subcontractor's activities shall be replaced as close to the original condition as possible at the subcontractor's expense in a reasonably short period of time, with as little inconvenience to the Owner as possible.

1.08 GUARANTEE AND REPLACEMENT

- A. All plant material shall be guaranteed by the subcontractor through one complete growing

season and dormant period after which they shall bud and leaf fully or be replaced. This shall be an unconditional guarantee and the contractor shall replace, free of charge, any plant materials which die during this period under the same conditions as described before. At the end of the guarantee period any material not showing definite life and growth shall be replaced.

- B. Plant replacement: During the guarantee period plants which die or are, in the opinion of the Architect, in an unhealthy, unsightly, or badly impaired condition, shall be replaced by the contractor as soon as is reasonably possible. No replacements shall be made in any season definitely unfavorable for planting. All replacements shall be plants of the same kind and size as specified in the plant list.

PART 2 PRODUCTS

2.01 PLANTING

- A. Topsoil: Topsoil shall be natural, fertile, agricultural soil, capable of sustaining vigorous plant growth. It shall not be contaminated with substances harmful to the growth of plants and humans. It shall have a ph range of 5.0 to 7.0 and contain not less than 5% organic matter. It shall be free of noxious weed, grasses and other foreign vegetation which would cause maintenance problems for the Owner.
- B. Soil Amendments: Backfill soil mix in plant beds and plant pits to be tested and amended as necessary to reach ph specified above.
- C. Fertilizer: Fertilizer shall be commercial type 12/12/12 at a rate of 5 lbs. nitrogen per cubic yard of backfill soil mix.
- D. Plants: A complete list of plants, including a schedule of quantities, sizes and other requirements is shown on the drawings.

2.02 MULCH

- A. Mulch shall be shredded and processed hardwood, free of mature seed, noxious weeds, egg cases, harmful insects or any other species or chemical detrimental to the development of plants or humans.
- B. Mulch shall be of uniform color, texture and particle size.
- C. Contractor to submit sample to Architect for approval prior to delivery to site or installation.

2.03 DECORATIVE GRAVEL

- A. Decorative gravel around air conditioning condenser shall be "smooth" river washed gravel, 1/2" to 1-1/2". Submit sample for approval.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Site to be at proper grade and requiring only removal of large rocks and debris before planting.
- B. Plants shall be dug during the proper seasons (depending on type of plant) and shall be balled and burlapped and stored properly so as to be available for planting as required by the job site schedule. Plantings for each building and site area shall be installed just prior

to occupancy for that building or area.

- C. Planting may be performed at any time weather permits. It is the intent that any areas occupied by the owner shall have planting completed.

3.02 EXISTING PLANT MATERIAL

- A. Existing trees and shrubs designed to remain shall be pruned of low branches and any dead branches and then shaped by an experienced plant trimmer.
- B. Any shoring necessary to maintain existing grade around trees shall be done by the landscaping contractor as shown on the drawings.

3.03 PREPARATION AND INSTALLATION

- A. Provide a minimum of 6" of topsoil in all planting beds.
- B. Incorporate backfill mix of topsoil, soil amendments and fertilizer in all plant pits.
- C. Tree pits shall be two feet (2') greater in diameter than the ball of earth or spread of roots of tree and sufficiently deep to allow for depth of the ball.
- D. Plant shrubs in pits within the bed one foot greater than the spread of the roots and 18" deep below finished grade, or as much deeper as is necessary to properly set the plant at finished grade.
- E. Ground covers shall be planted so they are at finish grade. Rooted cuttings shall be planted in trench that is 6" greater than the spread of the roots. Individual peat pots shall be planted in pits 4" deeper than the depth of the pot and backfilled properly to set the plant at finish grade.
- F. Ground cover beds shall be scarified to a depth of 6". Two inches of peat or appropriate soil additive and recommended amount of fertilizer per manufacturer's instructions.
- G. Perennial bed shall be prepared by removing 4" of existing soil and scarifying remaining grade by hand to a total depth of 8". Incorporate into backfill soil fertilizer and amendments as needed.
- H. Install plants to stay clear of proposed lighting.
- I. Plant shrubs so the center of the shrub is planted beyond the building drop line.
- J. Plant ground covers no closer than 2' from shrub plantings.
- K. Wrapping and Staking: Wrap all trees immediately after they are planted. Types of plants to be staked and acceptable methods of staking are shown on plans. Tree stakes and guy stakes shall be pressure treated pine with a minimum cross section of 2" x 2" nominal dimension or capable of withstanding above ground and underground conditions. Guy

wires shall be of 12 gauge or comparable strength, malleable, galvanized, solid or annealed wire. Wires shall not come in contact with plant, but shall be covered with rubber hosing at point of contact. Hose material shall be two ply, 1/2" diameter reinforced rubber hose or comparable of a length sufficient to properly protect tree trunk. Commercial tree wrapping product shall be of a bituminous unpregnated tape, heavy crepe paper or comparable 4" to 12" wide. The trunks of all trees shall be wrapped spirally from bottom to a height of the second branches. Wrap neatly and snugly and overlap approximately 2" and adequately secure in place. Twine shall not be less than two ply jute or comparable nonmetallic material of neat inconspicuous appearance.

3.04 MULCH INSTALLATION

- A. Mulch shall be applied to all plant beds and planting materials as shown on the drawings and details at a depth of 2".
- B. Individual trees to be mulched with a 3' diameter saucer.
- C. Evergreen trees shall have mulch installed 1'-0" beyond outside edge of tree.
- D. Plant beds and individual trees to have a "V" shaped edge to separate mulch and lawn as shown on drawings.

3.05 DECORATIVE GRAVEL

- A. Install decorative gravel around air conditioning condensers as shown on drawings. Make subgrade to smooth and level condition. Install gravel a minimum of 2" deep and rake out even with concrete pads and adjoining grass or mulch.

3.06 CARE AND MAINTENANCE

- A. Plants to be watered as soon as in place until soil is moist, but not water logged. Any permits to use fire hydrant and equipment needed shall be the responsibility of this subcontractor.
- B. This subcontractor shall be responsible for maintenance of plant material until final acceptance.
- C. It shall be the responsibility of this subcontractor to maintain and thoroughly water all plant material as necessary unless otherwise agreed to in writing by the General Contractor.

3.07 CLEAN UP

- A. This subcontractor shall keep the premises free of debris and unusable materials resulting from his work and, as work progresses, or upon request by the General Contractor, he shall remove such debris and materials from the Owner's property. Particular attention is to be paid to cleaning up piles of stone, dirt, and clods which result from fine grading and raking. Sidewalks and paved areas are to be hosed down and left clear.

END OF SECTION