

JIM WHITTEN ROOF CONSULTANTS, LLC +
TEJAS DESIGN, LLC

AISD 2020 ROOF IMPROVEMENTS
ALLISON ELEMENTARY SCHOOL



02/07/20

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In accordance with the State of Texas Board of Architectural Examiners, Rules and Regulations of the Board Regulating the Practice of Architecture, Subchapter G, Compliance and Enforcement, State of Texas Registered Architect Don Hurst, #12057, is responsible for the preparation of all Construction Documents issued by Jim Whitten Roof Consultants, LLC.

SECTION 011000

SUMMARY OF WORK

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work generally includes reroofing existing low-sloped and steep-sloped modified bitumen roofs with new insulated fully adhered 80-mil fleece back PVC KEE roof system. Roof system shall meet UL Class A, comply with City of Austin applicable current building codes, and qualify for roof membrane manufacturer's 20 year no dollar limit roof system guarantee.

1.02 STORAGE

- A. Limited storage area will be provided by Owner where available. Supply temporary storage required for storage of equipment and materials for duration of Project. Utilize only areas designated by Owner for storage.

1.03 BUILDING OCCUPANCY

- A. Owner will occupy premises during periods of construction for the conduct of its normal operations. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- B. Pre-determine and obtain approval, in advance from Owner, for vertical and horizontal transportation of labor and construction materials onto and out of buildings.

1.04 WORKING HOURS AND SCHEDULE

- A. Submit work schedule to Owner. Working hours shall generally between the hours of 7:00 A.M. and 6:00 P.M., Monday through Friday, except holidays.
- B. Obtain approval from Owner prior to altering Work schedule.
- C. Obtain approval from Owner prior to performing weekend or after hours work.

1.05 PRE-JOB DAMAGE SURVEY OF FACILITY

- A. Perform a thorough survey of property and all affected areas of the buildings with Owner prior to starting the work in order to document existing damage and operational status of existing equipment. Non-functional or damaged items identified on this list will not be the responsibility of Contractor unless further damaged by Contractor during execution of Project.
- B. Consider any damage to buildings or property not identified in the pre-job damage survey as having resulted from execution of this Contract and correct at no additional expense to Owner.

1.06 GUARANTEE AND WARRANTY

- A. Provide Two-Year Contractor's Warranty for materials and installation. Refer to Section 017836, Contractor's Roofing Warranty.

- B. Provide Roof Manufacturer's 20-Year No Dollar Limit (NDL) System Guarantee.
- C. Both the Contractor's Warranty and the Manufacturer's Guarantee shall list the specific building by name and identify roof area/section by Owner's roof area/section designation. Effective date for both the Contractor's Warranty and the Manufacturer's Guarantee shall be the Contractual Date of Substantial Completion.
- D. Both the Contractor's Warranty and the Manufacturer's Guarantee shall cover damage to Work resulting from failure to resist penetration of moisture and replacement of assembly components that fail due to material failure or faulty workmanship.
- E. Should roof samples be required by manufacturer issuing guarantee and if, for any reason, deficiencies are found within the samples, the Contractor shall at its expense, make repairs, etc., as necessary, to correct deficiencies and satisfy the requirements of the manufacturer issuing the guarantee.

1.07 UNUSUAL INCLEMENT WEATHER POLICY

- A. Under a Calendar Day Contract, Contractor may be granted an extension of time because of unusual inclement weather, including but not limited to unusual rainfall events, which are beyond the normal rainfall recorded and expected for Austin, Texas. However, the Contractor will not be granted an extension of time for "normal rainfall", as described below.
- B. "Unusual Inclement Weather" is defined as a rain event or other weather related event which occurs at the site and is of sufficient magnitude to prevent CONTRACTOR from performing units of Work critical to maintaining the Progress Schedule.
- C. Baseline Rain Day Determination. "Normal rainfall" compiled by the State climatologist, based on U.S. Weather Bureau Records for Austin, Texas, is considered a part of the Calendar Day Contract, and is not a justification for an extension of time. Listed below are the number of days in each month for which no compensatory days for rainfall events ("Rain Days") in such months may be claimed:

| | | | |
|----------|--------|-----------|--------|
| January | 8 days | July | 5 days |
| February | 8 days | August | 5 days |
| March | 7 days | September | 7 days |
| April | 7 days | October | 7 days |
| May | 9 days | November | 7 days |
| June | 6 days | December | 7 days |

END OF SECTION

SECTION 013200

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Preliminary Construction Schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Submittals Schedule.
 - 4. Daily construction reports with digital photographs.
- B. Related Sections include the following:
 - 1. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 2. Division 01 Section "Submittal Procedures" for submitting schedules and reports.

1.03 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- F. Fragment: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- G. Major Area: A story of construction, a separate building, or a similar significant construction element.
- H. Milestone: A key or critical point in time for reference or measurement.
- I. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- J. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.04 SUBMITTALS

- A. Submittals Schedule: Submit schedule electronically in PDF format. Arrange the following information in a tabular format:
1. Scheduled date for first submittal.
 2. Specification Section number and title.
 3. Submittal category (action or informational).
 4. Name of subcontractor.
 5. Description of the Work covered.
 6. Scheduled date for Architect's/Roof Consultant's final release or approval.
- B. Contractor's Construction Schedule: Submit an electronic copy of schedule, in large enough format to show entire schedule for entire construction period. Include type of schedule (Initial or Updated) and date prepared.
- C. Daily Construction Reports: Submit electronic copy to Roof Consultant of previous day's work by 10:00 AM the following work day; submit in PDF format. Incorporate into each PDF of each work period at least 8 date-stamped digital photographs taken on that work period. Do not send photos separately.
- D. Field Condition Reports: Submit electronic PDF format copy at time of discovery of differing conditions.

1.05 QUALITY ASSURANCE

- A. Comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to Contractor's Construction Schedule, including, but not limited to, the following:

1. Verify availability of qualified personnel needed to develop and update schedule.
2. Discuss constraints, including phasing, work stages, area separations, interim milestones, and partial Owner occupancy.
3. Review and finalize list of construction activities to be included in schedule.
4. Review submittal requirements and procedures.
5. Review procedures for updating schedule.

1.06 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 1. Secure time commitments for performing critical elements of the Work from parties involved.
 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.01 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 2. Initial Submittal: Submit concurrently with preliminary bar-chart schedule.

2.02 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

2.03 CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within seven days of date established for the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 30 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.04 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. Approximate count of personnel at Project site.
 - 3. Equipment at Project site.
 - 4. Material deliveries.
 - 5. High and low temperatures and general weather conditions. Indicate whether there was unusual inclement weather at the Project site. "Unusual Inclement Weather" is defined as a rain event or other weather related event which occurs at the site and is of sufficient magnitude to prevent CONTRACTOR from performing units of Work critical to maintaining the Progress.
 - 6. Schedule.
 - 7. Accidents.
 - 8. Meetings and significant decisions.
 - 9. Unusual events (refer to special reports).
 - 10. Stoppages, delays, shortages, and losses.
 - 11. Emergency procedures.
 - 12. Orders and requests of authorities having jurisdiction.
 - 13. Change Orders received and implemented.
 - 14. Construction Change Directives received and implemented.
 - 15. Services connected and disconnected.
 - 16. Partial Completions and occupancies.
 - 17. Substantial Completions authorized.
 - 18. Include a minimum of eight digital, date-stamped color photographs representative of the work being performed on the date of the report.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.05 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special

report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule two days before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate Actual Completion percentage for each activity.

- B. Distribution: Distribute copies of approved schedule to Architect/Roof Consultant, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

CONTRACTOR'S DAILY REPORT

| PROJECT INFORMATION | |
|---------------------|-------------------|
| Project Name: | Observation Date: |
| Project Location: | Owner: |
| Roofing Contractor: | Superintendent: |

| SYSTEM DESCRIPTION |
|--------------------------------------------------------|
| List existing construction components at area of work: |
| |
| |
| |

| CONDITIONS - PERSONNEL | |
|------------------------------------------------|----------------------|
| CDs Onsite (Y/N): | Weather Conditions: |
| Crew: | Foreman: |
| Subcontractor(s): | Sub. Superintendent: |
| Subcontractor Crew: | Sub. Foreman: |
| VISITORS TO SITE: NAME, FIRM, PURPOSE OF VISIT | |

Meetings (Y/N) and Description:

| SCOPE COMPLETED | |
|---------------------------------|--------------------------------------------|
| Work Area: | Squares: |
| Tear Off (SQ): | Base Sheet (SQ): |
| Insulation Layers (No. and SQ): | Coverboard (SQ): |
| Base Ply (SQ): | Cap Sheet (SQ): |
| Membrane Flashing (LF): | Metal Flashings, Gutters, Downspouts (LF): |
| Other (Indicate units): | Other (Indicate Units): |

Comments:

Delays, Stoppages?

Accidents, Emergencies?

MEP Systems Disconnected/Reconnected?

| CHANGES | |
|----------------------|-----------|
| RFI No. | Notified: |
| RFI Description: | |
| RFI No. | Notified: |
| RFI Description: | |
| A/E Field Directive: | By: |
| Description: | |
| A/E Field Directive: | By: |
| Description: | |

| VARIANCE ITEMS | |
|--------------------|-----------|
| Location: | Notified: |
| Item Description: | |
| Corrective Action: | |
| Location: | Notified: |
| Item Description: | |
| Corrective Action: | |

DAILY REPORT PROGRESS PHOTOGRAPHS

| | |
|--|--|
| | |
| | |
| | |
| | |

END OF SECTION

SECTION 013300

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Make submittals required by the Contract Documents in a timely manner and at approximate times in the execution of the Work to allow for sufficient and prompt review by Roof Consultant. Revise and resubmit as necessary to establish compliance with the specified requirements.

1.02 WORK INCLUDED

- A. Submit complete sets, bound in three-ring binders, of the submittals required in the Contract Documents. Submit separate sets entitled "Pre- Job Submittals" and "Post-Job Submittals".
- B. Update submittals to Roof Consultant as necessary to account for all new materials used on the Project.
- C. Submit one complete set of "Pre-Job Submittals" to Roof Consultant for review, prior to the pre-construction meeting. The Pre-Construction Meeting will not be scheduled until the complete Pre-Job Submittals have been reviewed by the Roof Consultant. The Work may not proceed until the complete pre-job submittal package has been reviewed by Roof Consultant. Once reviewed by Roof Consultant and review comments addressed by Contractor, submit three sets of reviewed "Pre-Job Submittals" to Roof Consultant.
- D. Submit one complete set of "Post-Job Submittals" to the Roof Consultant for review, following the final completion of the Work. Requests for final payment will not be approved until the Post-Job Submittal package has been reviewed by Roof Consultant. Once reviewed by Roof Consultant and review comments addressed by Contractor, submit three sets of reviewed "Post-Job Submittals".
- E. Identify individual submittals by name and include a table of contents in each submittal package.

1.03 QUALITY ASSURANCE

- A. Carefully review and coordinate all aspects of each item being submitted.
- B. Verify that each item and its appropriate submittal conform in all respects with the specified requirements.
- C. Certify, by affixing signature of Contractor's authorized representative to the corner of each submittal package, that this coordination has taken place.

1.04 PRE-JOB SUBMITTALS

- A. Submit product data for all materials. Product data and information shall indicate each product incorporated into the project does not contain asbestiform minerals on any kind.
- B. Submit manufacturer's installation instructions and two 12-inch by 12-inch samples of each component of the roofing and flashing membrane, and insulation board.
- C. Submit a copy of the pre-installation notice (PIN) submitted to roof manufacturer.
- D. Submit manufacturer's system assembly indicating fastening ply, inter-plyes and flashings.
- E. Submit a detailed outline of the methods and means to be followed during the removal and replacement of the roofing and related repairs. Once accepted by Owner, this outline may only be changed with the written approval of Owner.
- F. Submit manufacturer's certification that materials meet or exceed specified requirements, including documentation that the proposed roofing system meets all the requirements of U.L. Class A and ASCE-7 requirements.
- G. Submit a letter from the primary roofing membrane manufacturer, indicating acceptance of all materials not manufactured by the primary roofing membrane manufacturer.
- H. Submit a letter from the primary roofing membrane manufacturer stating that the Contractor is an approved applicator of the manufacturer's guaranteed roof system as herein specified. Submit letter prior to award, as requested by the Owner.
- I. Submit letters from the primary roofing membrane manufacturer stating intent to issue guarantee at no cost to the Owner. Letters shall contain the following information:
 - 1. Project name; project address; project size.
 - 2. Length of Guarantee - 20 years
 - 3. No Dollar Limit (NDL) – System Warranty
 - 4. Manufacturer's additional requirements, if any. There will be no additions or deletions from the required guarantee form.
 - 5. Sample copy of actual guarantee.
 - 6. Verification that the Guarantee is transferable.
- J. Any building permits as required by the City of Austin for the construction or demolition work required during the progress of the Work. If no permits are required, submit notarized letter stating such.
- K. Contractor shall include a detailed Critical Path Method (CPM) bar chart or network schedule for each building. Schedule shall include a complete breakdown of all phases of the work. Owner to approve all schedules and sequencing of the work. No changes in approved schedule will be made without Owner concurrence.

- L. Insurance certificate issued to Owner by Contractor's insurance carrier listing all coverages as specified in the General Conditions and naming Austin Independent School District and JIM WHITTEN ROOF CONSULTANTS, LLC + TEJAS DESIGN, LLC as Additional Insureds.
- M. Pre-damage survey: submit pre-damage survey of all pre-existing damage to building, site, hardscape and landscaping within and adjacent to project scope of work. Submit digital video or photographs depicting location and extent of all pre-existing damage.

1.05 POST-JOB SUBMITTALS

- A. Items included in Section 017000.
- B. Affidavit of Release of Liens.
- C. Certificate of Completion.
- D. Primary roofing material manufacturer's representative site visit reports.
- E. Record Documents consisting of As-Built copies of the Drawings and Specifications in electronic format (PDF) indicating all changes to the Contract Document Drawings and Specifications.

PART 2 - PRODUCTS

2.01 SAMPLES

- A. Submit full range of manufacturer's standard colors, textures, and patterns for Owner's selection. Submit samples for selection of finishes within ten days after date of Contract.
- B. Submit samples to illustrate functional characteristics of the product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.
- C. Include identification on each sample, giving full information.
- D. Submit full range of colors of pre-finished metal for Owner's approval.

2.02 MANUFACTURER'S LITERATURE

- A. Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, clearly show which portions of the contents are being submitted for review.

2.03 SHOP DRAWINGS

- A. Submit graphically accurate details and drawings of special conditions indicated in other sections of the Contract Documents. Identify materials, scale, and preparer (firm and personnel).

- B. Reproductions of the project plans will not be accepted as shop drawings.

PART 3 - EXECUTION

3.01 IDENTIFICATION OF SUBMITTALS

- A. Number consecutively and clearly identify all submittals. Show identification on at least the first page of each submittal, and elsewhere as necessary for positive identification of the submittal.
- B. Accompany each submittal package with a letter of transmittal showing all information required for identification and checking.

3.02 TIMING OF SUBMITTALS

- A. Make submittals far enough in advance of scheduled dates of commencement, execution or installation to provide time required for reviews, for securing necessary approvals, for possible revisions and re-submittals, and for placing orders and securing delivery.
- B. Accept responsibility for delays resulting from incomplete submittal packages.

3.03 ROOF CONSULTANT'S REVIEW

- A. Partial submittals may be rejected for non-compliance with the Contract Documents.
- B. Review by Roof Consultant does not relieve Contractor from responsibility for errors, which may exist in the submitted data.
- C. Make revisions when required by Roof Consultant and resubmit for review.
- D. Contractor shall pay a review fee of \$250, payable to the Owner for subsequent re-submittal reviews by Roof Consultant required after the first re-submittal review.

END OF SECTION

SECTION 014100

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 GOVERNING CODES

- A. Perform the work in accordance with the following applicable codes:
 - 1. International Building Code, current edition as amended and enforced by City of Austin.
 - 2. Uniform Plumbing Code, current edition as amended and enforced by City of Austin.
 - 3. Uniform Mechanical Code, current edition as amended and enforced by City of Austin.
 - 4. International Electric Code, current edition as amended and enforced by City of Austin.
 - 5. International Fire Protection Code, current edition as amended and enforced by City of Austin.
 - 6. International Energy Conservation Code, current edition as amended and enforced by City of Austin.

- B. Code references within the Drawings and Specifications shall be utilized for this project unless in conflict with minimum current standards set forth by governing municipal, state, federal or other authorities having jurisdiction over this project.

- C. Materials shall meet fire and wind uplift criteria as indicated in the most current available publications of the following authorities and classifications:
 - 1. Underwriters Laboratories, Inc. (UL): Class A Fire Hazard Classification.
 - 2. Underwriters Laboratories, Inc. (UL): ANSI/UL 1897, "Uplift Tests for Roof Covering Systems".

- D. Obtain all necessary permits and arrange for any inspections or review required by the governing authorities.

END OF SECTION

SECTION 014200

REFERENCES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. The date of the standard is that in effect as of the Bid date.

1.03 SCHEDULE OF REFERENCES

| | |
|--------|----------------------------------------------------------------------------------------------------------------------------|
| AA | Aluminum Association 818 Connecticut Avenue, N.W. Washington, DC 20006 |
| ANSI | American National Standards Institute 1430 Broadway New York, NY 10018 |
| APA | American Plywood Association P.O. Box 11700 Tacoma, Washington 98411 |
| ARMA | Asphalt Roofing Manufacturers Association 1156 15 th Street N.W. Suite 900 Washington, DC 20005 |
| ASHRAE | American Society of Heating, Refrigerating and Air Conditioning Engineers 1791 Tullie Circle, N.W. Atlanta, GA 30329 |
| ASTM | American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103 |
| AWPA | American Wood-Preservers' Association 7735 Old Georgetown Road Bethesda, MD 20014 |
| CDA | Copper Development Associates |
| FM | Factory Mutual System (FM Global) 1151 Boston-Providence Turnpike Norwood, MA 02062 |
| EPA | Environmental Protection Agency |

401 M. St. S.W.
Washington, DC 20460

- FS Federal Specifications
General Services Administration
Specifications and Consumer Information
Distribution Section (WFSIS)
Washington Navy Yard, Bldg. 197
Washington, DC 20407
- NRCA National Roofing
Contractors Association
10255 W. Higgins Road, Suite 600
Rosemont, IL 60018
- NEMA National Electrical Manufacturers Association
2101 L. St. N. W.
Washington, DC 20037
- NFPA National Fire Protection Association
Battery March Park
Quincy, MA 02269
- NFPA National Forest Products Association
1619 Massachusetts Avenue, N.W.
Washington, DC 20036
- OSHA Occupational Safety and Health Administration
200 Constitution Avenue
Washington, DC 20210
- SDI Steel Deck Institute
Box 3812
St. Louis, MO 63122
- SFPA Southern Forest Products Association
P.O. Box 52468
New Orleans, La 70152
- SMACNA Sheet Metal and Air Conditioning Contractors'
National Association
8224 Old Court House Road
Vienna, VA 22180
- SPRI Single Ply Roofing Institute
77 Rumford Avenue, Suite 3B
Waltham, MA 02453
- UL Underwriters' Laboratories, Inc.
333 Kingston Road
Northbrook, IL 60062

END OF SECTION

SECTION 014500

QUALITY CONTROL

PART 1 - GENERAL

1.01 CONTRACTOR

- A. Be currently approved and certified by the manufacturer of the roofing materials to be used. Use only skilled roofers completely familiar with the products and manufacturer's current recommended methods of installation.
- B. Contractor shall maintain a permanent office for the conduct of its business.
- C. Provide a letter from a minimum of three major roofing materials manufacturers stating that your company has been an approved or certified applicator for a minimum of five (5) years prior to the Bid Date and that your company is approved to install those manufacturer's twenty year no dollar limit (NDL) total system guarantee.
- D. Provide primary products, including each type of roofing sheet and insulation produced by a single manufacturer, both of which have produced these types of products successfully for not less than five years, and provide secondary products that are acceptable to manufacturers of primary products. Specified insulation products that are not manufactured by, but are acceptable to the primary membrane manufacturer, may be used.
- E. Require that the primary roof membrane manufacturer conduct a minimum of one site visit per month during construction, and one final site visit. Contractor shall submit copies of manufacturer representative's site visit reports to Roof Consultant within 5 business days from date of inspection.
- F. Provide Air Quality Measures
 - 1. Outdoor Air - Take measures to prevent fumes from adhesives and other materials from entering the building.
 - 2. Temporary seal off of air intake facilities near the work area to prevent smoke, fumes, or odor from entering the interior spaces.
 - 3. Remove temporary seals of air intakes as soon as possible.

1.02 ROOF CONSULTANT

- A. Roof Consultant will provide a periodic report of activities and non-conformance items, as applicable, to Owner and Contractor. All non-conformance items not corrected will remain on a non-conformance list until such time as they are corrected.
- B. A final punch list of non-conformance items requiring correction will be published by Roof Consultant upon Substantial Completion of the Project. These items must be completed upon receipt and prior to final payment.

END OF SECTION

SECTION 015000

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 UTILITIES

- A. Provide power and water as necessary to complete the Work. Utilities will be provided and paid for by Owner.

1.02 TEMPORARY ELECTRICITY

- A. Connect to existing power service at locations approved by Owner's representative. Power consumption shall not disrupt Owner's need for continuous service.
- B. Provide temporary electric feeder from existing building electrical service at location as directed by Owner.
- C. Exercise measures to conserve energy.
- D. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each roof area. Provide flexible power cords as required. All such devices shall be GFCI.
- E. Provide main service disconnect and over-current protection at convenient location.
- F. Permanent convenience receptacles may not be utilized during construction.

1.03 TEMPORARY WATER SERVICE

- A. Contractor is responsible for connecting to existing water source for construction operations, at location as directed by Owner.
- B. Exercise measures to conserve water.

1.04 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain enclosed portable self-contained units or temporary water closets and urinals, secluded from public view, in location approved by Owner. Keep units locked at all times. Provide access to Contractor's employees only.
- B. Existing facilities shall not be used.
- C. Maintain daily in clean and sanitary condition.

1.05 TEMPORARY FIRE PROTECTION

- A. Maintain a minimum of three, 30-pound fire extinguishers at each area where work is in progress at all times. One fire extinguisher shall be kept with stored flammable materials and two on the roof surface at each work area.

1.06 BARRIERS

- A. Provide barriers around trees and plants that are within thirty feet of the building. Protect lawns and landscape. Replace trees, plants, lawns and landscaped areas that are damaged by Contractor.
- B. Protect vehicular traffic and pedestrians from damage or injury, as applicable, which may arise out of the Work.
- C. Protect buildings, equipment, sidewalks, etc. Contractor is responsible for cleaning or repairing any surfaces which are marked or otherwise damaged as a result of the Work to the satisfaction of Owner to the extent that it is returned to its original condition.
- D. Provide ground and parking lot protection to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

1.07 STORMWATER CONTROL

- A. Contractor shall ensure that stormwater drains properly from the roof during construction. The building shall be kept watertight throughout the construction process.
- B. Protect site storage areas from ponding or running water. Provide water barriers as required to protect products from drainage.

1.08 PROTECTION OF INSTALLED WORK

- A. Protect installed Work and provide special protection where specified in individual specification Sections.
- B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits or openings.
- D. Prohibit traffic or storage upon new roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from roofing material manufacturer.

1.09 PARKING

- A. Arrange for temporary parking areas to accommodate construction personnel as approved by Owner. Parking will be allowed in staging areas only and no parking will be allowed for employees' personal vehicles.

1.10 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly fashion on a daily basis.
- B. Remove debris and rubbish from closed or remote spaces prior to enclosing the space.
- C. Remove waste materials, debris, and rubbish from site daily and legally dispose of off-site.

1.11 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary equipment, facilities and materials, prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

END OF SECTION

SECTION 016000

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 PRODUCTS

- A. Products include materials, equipment, and systems.
- B. Comply with Specifications and referenced standards as minimum requirements.
- C. Components required to be supplied in quantity within a Specification section shall be the same, and shall be interchangeable.
- D. Do not use materials and equipment removed from existing structure, except as specifically required, or allowed, by Contract Documents.
- E. All products incorporated into the project shall be asbestos free.

1.02 TRANSPORTATION AND HANDLING

- A. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.
- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.
- C. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, products are undamaged, and shelf-life will not expire before installation.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store all roof system materials in enclosed trailers or storage containers. When the roof is to be stocked, store materials off the ground or on roof deck on pallets. Store rolled materials on end. Unprotected, moist or otherwise damaged materials or materials with evidence of moisture damage such as staining shall be conspicuously marked for permanent removal from the job. Store emulsions at temperatures above 40 degrees Fahrenheit. Handle rolled goods with care to prevent damage to edges or ends.
- C. Materials will be checked for general conformance to specifications. Materials found that are not approved or do not meet required standards shall be marked as rejected and permanently removed from the jobsite.
- D. Use care in transporting materials across the roof surface. Repair existing roof and re-roofed areas where workmen have damaged the roof system. Do not transport materials over re-roofed area unless protected by plywood.

- E. Scatter material stored on the roof surface over the roof deck to avoid damage to the structural roof system. High concentrated loads will not be permitted on the roof. It is the Contractor's responsibility to ensure that the roof is not overloaded with stored materials.
- F. Overnight rooftop storage of roof system materials is prohibited. Only those materials required for immediate installation will be permitted on the roof.
- G. If rooftop hoisting equipment is used, it shall be properly assembled and maintained. Only employees of the Contractor that are thoroughly familiar with hoisting equipment shall operate such equipment. All such equipment shall be erected and supported so that it will not damage the existing structural deck, the walls or new roofing. Repair to pre-damaged condition any deck, walls, walks, or other existing surfaces that are damaged as a result of Contractor's Work.
- H. Furnish plywood walkways and take any other precautions required to prevent tracking of aggregate from existing membrane to be removed into new work areas where aggregate pieces can be trapped within the new membrane. Instruct and monitor Contractor's workers to assure that aggregate is not tracked into new work area on workmen's shoes or equipment wheels. Discovery of entrapped aggregate within the new membrane is sufficient cause for rejection of that Work. Weigh down plywood walkways to ensure that they are not lifted or moved by wind.
- I. No use of building interiors will be allowed.

1.04 PRODUCTS LIST

- A. Within five days after date established in Notice to Proceed, submit complete list of major products for use, with name of manufacturer, trade name, and model number of each product.

1.05 SUBSTITUTIONS

- A. Substitution requests must be submitted a minimum of seven (7) calendar days prior to Bid date, in accordance with Instructions to Offerors. After Bid date, substitutions will be considered only when a product becomes unavailable due to no fault of Contractor.
- B. Document each request with complete data substantiating compliance of proposed substitutions with Contract Documents.
- C. Request constitutes a representation that Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
 - 2. Will provide the same warranty for substitution as for specified product.
 - 3. Will coordinate installation and make other changes which may be required for Work to be complete in all respects.
 - 4. Waives claims for additional costs, which may subsequently become apparent.

END OF SECTION

SECTION 017329

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.

1.03 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.04 SUBMITTALS

- A. Cutting and Patching: Submit cutting and patching procedures at least 3 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
 - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 7. Architect's/Roof Consultant's Approval: Obtain approval of cutting and patching Bid before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.05 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
 - 1. Primary operational systems and equipment.
 - 2. Air or smoke barriers.
 - 3. Fire-suppression systems.
 - 4. Mechanical systems piping and ducts.
 - 5. Control systems.
 - 6. Communication systems.
 - 7. Conveying systems.
 - 8. Electrical wiring systems.
 - 9. Operating systems of special construction in Division 13 Sections.
 - 10. Security alarm system.
 - 11. Fire alarm system.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
 - 1. Water, moisture, or vapor barriers.
 - 2. Exterior curtain-wall construction.
 - 3. Equipment supports.
 - 4. Piping, ductwork, vessels, and equipment.
 - 5. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.06 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to [minimize] [prevent] interruption to occupied areas.

3.03 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage

elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 5. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION

SECTION 017700

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 CLOSEOUT PROCEDURES

- A. Comply with procedures stated in General Conditions of the Contract for issuance of certificate of Substantial Completion.
- B. When contractor considers Work has reached final completion, submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Owner's inspection.
- C. In addition to submittals required by the conditions of the Contract, provide submittals required by governing authorities, and submit a final statement of accounting giving total Contract sum, previous payments, and sum remaining due.
- D. Roof Consultant will issue a final change order reflecting approved adjustments to contract amount not previously made by change order.

1.02 FINAL CLEANING

- A. Execute prior to final inspection.
- B. Clean exterior surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces. Clean roofs, gutters, downspouts, and drainage systems.
- C. Clean site; sweep paved areas, rake clean other surfaces.
- D. Remove waste and surplus materials, rubbish, and construction facilities from the Project and from the site.
- E. Remove all excess adhesive from roof surfaces and adjacent surfaces.
- F. Power-wash all roof membrane surfaces in accordance with roof membrane manufacturer's requirements.

1.03 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following record documents; record actual revisions to the Work:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.

- B. Store record documents separate from documents used for construction.
- C. Record information concurrent with construction progress. The Contractor will allow Roof Consultant to review record documents for current change documentation at each pay request.
- D. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternatives utilized.
 - 3. Changes made by Addenda and Modifications.
- E. Record documents and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
 - 2. Field changes of dimension and detail.
 - 3. Details not on original Contract Drawings.
 - 4. Submit documents specified in 1.03 A. through 1.03 E. to Roof Consultant with claim for final Construction Voucher and Monthly Construction Payment Affidavit.

1.04 WARRANTIES AND GUARANTEES

- A. Provide two original, notarized copies of all warranties and guarantees.
- B. Verify that all warranties and guarantees have the same effective date, the Contractual Date of Substantial Completion.

END OF SECTION

SECTION 017836

CONTRACTOR'S ROOFING WARRANTY

WHEREAS _____

of (Address) _____

herein called the "Contractor", has performed roofing and associated work on the following project.

Owner: _____

Address: _____

Number and Type of Building: _____

Address: _____

Area of Work: _____ Date of Acceptance _____

Warranty Period: TWO YEARS Date of Expiration _____

AND WHEREAS the Contractor has contracted with Owner to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period.

NOW THEREFORE the Contractor hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work, and as are necessary to maintain said work in watertight condition.

This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by: (a) lightning, windstorm, hailstorm, and other unusual phenomena of the elements; (b) fire; (c) failure of roofing system substrate including cracking, settlement, excessive deflection, deterioration, and decomposition; (d) faulty construction of vents, equipment supports, and other penetrations of the work; (e) repeated vapor condensation on bottom of roofing; and (f) activity on roofing by other persons including construction contractors and maintenance personnel, whether authorized or unauthorized by Owner. When work has been damaged by any of the foregoing causes, Warranty shall be null and void until such damage has been repaired by the Contractor, and until cost and expense thereof has been paid by the Owner or by another responsible party so designated.
2. The Contractor is responsible for work covered by this Warranty, but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
3. The Contractor shall be responsible for repairing any defect attributable to Contractor's method or manner of installation of the roof membrane during the two-year period at Contractor's sole cost and expense.

- a. During the twenty-third (23rd) month following the Contractor's date of substantial completion, the Contractor shall have thirty days to coordinate and perform a roof inspection with the Roof Consultant, roof material manufacturer's representative and the Owner's representative.
 - b. Contractor shall coordinate a roof inspection with the Roof Consultant, roof material manufacturer's representative and the Owner's representative during the ninety-day period preceding the expiration date of the Two-Year Contractor's Warranty.
 - c. Failure to perform inspections specified in 3.a. and 3.b. and repair defects (if any) will be cause to consider the Contractor in default. The Owner will then submit written notice of default to the Contractor's bonding company.
4. During Warranty Period, if the Owner allows alterations of work by anyone other than the Contractor, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, the Warranty shall become null and void upon date of said alterations, but only to extent said alterations affect work covered by this Warranty. If the Owner engages the Contractor to perform said alterations, warranty shall not become null and void, unless the Contractor, prior to proceeding with said work, shall have notified the Owner in writing that said alterations would likely damage or deteriorate the work, thereby reasonably justifying a limitation or termination of this Warranty.
 5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void upon date of said change, but only to extent said changes affect work covered by this Warranty.
 6. The Owner shall promptly notify the Contractor of observed, known, or suspected leaks, defect or deterioration, and shall afford reasonable opportunity for the Contractor to inspect the work, and to examine evidence of such leaks, defects or deterioration.
 7. This Warranty is recognized to be the only Warranty of the Contractor on said work, and shall not operate to restrict or cut off the Owner from other remedies and resources lawfully available to him in cases of roofing failure. Specifically, this Warranty shall not operate to relieve the Contractor of responsibility for performance of original work.

IN WITNESS THEREOF, this instrument has been duly executed this ____ DAY of _____,
20____.

Signature

Firm Name

Typed Name and Title

Address

Telephone Number

City/State/Zip

SUSTAINABLE CONSTRUCTION REQUIREMENTS
SECTION 018113

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Section includes general requirements and procedures for sustainable construction practices and documentation.
 2. For additions and new construction, section includes requirements for achieving a minimum Austin Energy Green Building (AEGB) Two Star rating.
- B. Related Sections:
1. General Conditions – Payment Procedures
 2. Section 013546 – Indoor Air Quality Management
 3. Section 017419 – Construction Waste Management
 4. Section 019113 – Commissioning Requirements
 5. Divisions 1 through 49 Sections for sustainability requirements specific to the work of each of those sections. See Appendix B.

1.2 REFERENCES

- A. Austin Energy Green Building (AEGB) Commercial Program – Source for AEGB commercial rating packet with materials calculators:
<http://www.austinenergy.com/energy%20efficiency/programs/green%20building/Programs/commercial.htm>
- B. City of Austin Code – Subchapter E of Chapter 25-2: Design Standards and Mixed Use, Article 2.5 Exterior Lighting:
http://www.ci.austin.tx.us/development/downloads/adopted_ordinance_e.pdf
- C. Green Seal Standard GS-11 - VOC thresholds for paints, primers and anti-corrosive coatings: www.greenseal.org
- D. South Coast Air Quality Management District (SCAQMD) Rule 1113 – VOC limits for architectural coatings, as per most recent amendment:
<http://www.aqmd.gov/rules/reg/reg11/r1113.pdf>
- E. South Coast Air Quality Management District (SCAQMD) Rule 1168 – VOC limits for adhesives, sealants and sealant primers, as per most recent amendment:
www.aqmd.gov/rules/reg/reg11/r1168.pdf
- F. Greenguard – Product certification for low emitting interior building materials, furnishings, and finish systems: www.greenguard.org

- G. Carpet and Rug Institute – Green Label Plus testing program for low VOC carpet. Green Label carpet pad certification for low VOC carpet cushion: www.carpet-rug.com
- H. Forest Stewardship Council – FSC product certification for wood and wood products: www.fsc.org
- I. Resilient Floor Covering Institute – Floor Score Certification for flooring products: www.rfci.com
- J. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 2nd edition, Chapter 3, - Indoor air quality measures during construction: www.smacna.org

1.3 SUSTAINABLE CONSTRUCTION REQUIREMENTS

- A. Adhere to requirements established by AISD and developed for project for sustainability and Green Building purposes. See Appendix A for specific measures involved in the project.
- B. For additions and new construction, adhere to requirements to enable a minimum of an AEGB Two Star rating be attained. See Appendix A for specific points involved in the project.
- C. Obtain Architect’s approval of substitution, change, or alteration of sustainable materials and installation procedures prior to incorporation into Project.
- D. Assist Architect in providing project sustainability documentation.
- E. Provide submittals required to document conformity to AEGB criteria on a scheduled basis as requested by Architect. For each submitted material and product requiring sustainability documentation, provide filled out Appendix C AISD Sustainability Submittal Sheet.

1.4 SUBMITTALS

- A. For all projects, provide the following:
 - 1. Management Plans:
 - a. Construction Waste Management Plan: Construction waste management plan complying with Division 1 Section 017419 “Construction Waste Management”.
 - b. Indoor Air Quality Management: Construction indoor air quality management plan complying with Division 1 Section 013546 “Indoor Air Quality Management”.

2. Progress Reports:
 - a. Construction Waste Management Reports: Monthly progress reports detailing diversion of waste from the landfill to comply with Division 1 Section 017419 “Construction Waste Management”.
 - b. Indoor Air Quality Management Reports: Construction indoor air quality management documentation showing compliance with Division 1 Section 013546 “Indoor Air Quality Management”.
 3. Sustainable Design Documentation Submittals:
 - a. Refer to Appendix A for sustainable goals to be achieved and Contractor requirements.
 - b. Refer to Appendix B for submittal documentation required to achieve sustainability goals.
 - c. Refer to Appendix C for sustainability coversheet for subcontractors to complete.
- B. For additions and new construction projects, those obtaining a 2-star AEGB rating, provide the following additional requirements:
1. Project Materials Cost Data Submittals: Submit documentation of information necessary for calculating Materials and Resources points for the Austin Energy Green Building Program:
 - a. Submit a Statement of Total Project Costs.
 - b. Schedule of Values: Submit a schedule of materials costs, labor and equipment excluded, for Divisions 2 through 49.
 - c. Materials and Products Cost Documentation: Submit documentation for each product and material submitted as follows:
 - i. Material Description:
 - i) Identify materials by specification section number.
 - ii) Provide separate line item for each material submitted.
 - ii. Cost data: Include materials cost data, excluding labor and equipment, for each line item submitted.
 2. Green Building Program Calculators: Submit completed materials calculators for submitted products and materials used on Project as follows:
 - a. Building Materials Calculator (Recycled Content and Texas Source)
 - b. Certified Wood Calculator (Forest Stewardship Council)

3. AEGB Basic Requirement Documentation: Provide the following required documentation for an Austin Energy Green Building rating:
 - a. Building Systems Commissioning: Comply with Division 1 Section 019113 “Commissioning Requirements”.
 - b. Roofing to Reduce Heat Island: Submit cut sheets and product data for roofing materials indicating solar reflectance and/or solar reflectance index (SRI).
 - c. Building Water Use Reduction: Submit cut sheets for all faucets, showerheads, toilets and urinals indicating flow rates (gallons/minute) and flush volumes (gallons/flush).
 - d. Low VOC Interior Paints and Coatings: Submit product data and/or Material Safety Data Sheets (MSDS) for all paints and coatings used inside the building’s moisture barrier indicating the VOC content of each product and verifying that each product meets the requirements of Green Seal GS-11 and SCAQMD Rule 1113.
 - e. Construction Waste Management: Comply with Division 1 Section 017419 “Construction Waste Management” and document a minimum of 50% diversion of waste by weight.

1.5 QUALITY ASSURANCE

- A. Designate personnel on Contractor’s staff responsible for instructing workers and overseeing and documenting results of sustainable design requirements for Project.
- B. Require compliance with sustainable design requirements by subcontractors and suppliers.

1.6 DEFINITIONS

- A. Texas Sourced Material: Materials that are manufactured or extracted within the State of Texas. Manufacturing refers to the final assembly of components into the building product that is installed at the Project site.
- B. Recycled Content – The percentage of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer).
 1. Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials.
 2. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.
- C. Agrifiber – Product manufactured from agricultural-based fiber.
- D. Material Safety Data Sheet (MSDS) – Sheet contains information about hazardous

chemicals, risks and recommended procedures for treating exposure. The sheet is federally required to be provided by manufacturers of chemically based products.

- E. Volatile Organic Compound (VOC) – as defined by the US EPA. A chemical compound or mixture, derived from a vegetable or animal source (including certain minerals such as coal or petroleum that originally came from vegetable or animal sources), contained in a solid or liquid that volatilizes or evaporates at room temperature or an elevated temperature and, therefore, becomes present in the air or in discharge as vapor or smoke.
- F. FSC – Forest Stewardship Council
- G. Chain-of-Custody – A document that tracks movement of wood from the forest to a vendor and is used to verify compliance with FSC guidelines.

PART 2 – PRODUCTS

2.1 HEAT ISLAND REDUCTION STANDARDS

A. Roofing: Solar Reflectance (SR) and/or Solar Reflectance Index (SRI) values-compliance options for roofs directly above cooled conditioned spaces in accordance with the 2012 International Energy Conservation Code are as follows:

1. Low sloped roofs, less than 2:12 slope, comply with ONE of the following:
 - a. Three-year aged solar reflectance of 0.55 minimum AND three-year aged thermal emittance of 0.75.
 - b. Initial solar reflectance of 0.70 and initial thermal emittance of 0.75
 - c. Three-year aged solar reflectance index (SRI) of 64.
 - d. Initial solar reflectance (SRI) of 82.
 - e. Exceptions:
 - 1) Portions of roofs that include or are covered by:
 - i. Photovoltaic systems or components.
 - ii. Solar air or water heating systems or components.
 - iii. Roof gardens or landscaped roofs.
 - iv. Above-roof decks or walkways.
 - v. Skylights.
 - vi. HVAC systems, components, and other opaque objects mounted above the roof.
 - 2) Portions of roofs shaded during the peak sun angle on the summer solstice by permanent features of the building, or by permanent features of adjacent buildings.
 - 3) Portions of roofs that are ballasted with a minimum stone ballast of 17 pounds per square foot (pst) (7.4 kg/m² or 23 psf (117 kg/m²) pavers.
 - 4) 4. Roofs where a minimum of 75 percent of the roof area meets a minimum of one of the exceptions above.
2. Steep sloped roofs, 2:12 slope or greater, comply with BOTH of the following:
 - a. Initial solar reflectance of 0.45 minimum, and
 - A-b. Initial Solar Reflective Index (SRI) of 35[JD1].

| Roof Pitch Type | SR minimum | SRI minimum |
|----------------------------------|-------------------|--------------------|
| <u>Low Sloped Roof < 2:12</u> | <u>.75</u> | <u>85</u> |
| <u>Steep Sloped Roof ≥ 2:12</u> | <u>.45</u> | <u>35</u> |

2.2 LOW-EMITTING MATERIALS STANDARDS

A. Adhesives and Sealants

- VOC limits in grams per liter for adhesives and sealants are as follows:

| | Maximum VOC Level (g/L) |
|------------------------------------------|-------------------------|
| Welding and Installation | |
| Indoor Carpet Adhesives | 50 |
| Carpet Pad Adhesives | 50 |
| Wood Flooring Adhesive | 100 |
| Rubber Floor Adhesives | 60 |
| Subfloor Adhesives | 50 |
| Ceramic Tile Adhesives | 65 |
| VCT and Asphalt Tile Adhesives | 50 |
| Dry Wall and Panel Adhesives | 50 |
| Cove Base Adhesives | 50 |
| Multipurpose Construction Adhesives | 70 |
| Structural Glazing Adhesives | 100 |
| Single Ply Roof Membrane Adhesives | 250 |
| PVC Pipe Welding (Adhesive) | 510 |
| CPVC Welding | 490 |
| ABS Welding | 325 |
| Plastic Cement Welding | 250 |
| Adhesive Primer for Plastic | 550 |
| Contact Adhesive | 80 |
| Special Purpose Contact Adhesive | 250 |
| Adhesive Primer for Traffic Marking Tape | 150 |
| Structural Wood Member Adhesive | 140 |
| Substrate Specific Applications | |
| Metal to metal | 30 |
| Plastic Foams | 50 |
| Porous Material (except wood) | 50 |
| Wood | 30 |
| Fiberglass | 80 |
| Sealants | |
| Architectural | 250 |
| Marine Deck | 760 |
| Nonmembrane Roof | 300 |
| Roadway | 250 |
| Single-Ply Roof Membrane | 450 |
| Other | 420 |
| Sealant Primers | |
| Architectural- Nonporous | 250 |
| Architectural- Porous | 775 |
| Modified Bituminous | 500 |
| Marine Deck | 760 |
| Other | 750 |

B. Paints and Coatings

- VOC Limits in grams per liter for paints, primers and anti-corrosive coatings are as follows:

| Coatings | Maximum VOC Level (g/L) |
|------------------------|--------------------------------|
| Flat Topcoat | 50 |
| Non-flat Topcoat | 100 |
| Primer | 100 |
| Anti-Corrosive Coating | 250 |

- VOC limits in grams per liter for clear wood finishes, coatings, stains, sealers and shellacs are as follows:

| | Maximum VOC Level (g/L) |
|-----------------------------------------------------|--------------------------------|
| Clear Wood Finish | |
| Varnish | 275 |
| Sanding Sealers | 275 |
| Lacquer | 275 |
| Concrete-Curing Compounds | 100 |
| Dry-Fog coatings | 150 |
| Floor Coatings | 50 |
| Industrial Maintenance Coatings | 100 |
| Primers, Sealers and Undercoaters | 100 |
| Quick-Dry Enamels | 50 |
| Quick-Dry Primers, Sealers, and Undercoaters | 100 |
| Roof Coatings | 50 |
| Roof Coatings, Aluminum | 100 |
| Roof Primers, Bituminous | 350 |
| Shellac | |
| Clear | 730 |
| Pigmented | 550 |
| Stains, Interior | 100 |
| Traffic Coatings | 100 |
| Waterproofing sealers | 100 |
| Wood Preservatives | 350 |

PART 3 – EXECUTION

3.1 CONSTRUCTION WASTE MANAGEMENT

- Construction Waste Management - Comply with Division 1 Section 01 74 19 “Construction Waste Management.”

3.2 INDOOR AIR QUALITY MANAGEMENT

- Indoor Air Quality Management – Comply with Division 1 Section 01 35 46 “Indoor

Air Quality Management“.

END OF SECTION 018113

SECTION 024100

DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Removal and disposal of non-functional roof membrane, roof insulation, membrane flashings and sheet metal flashings to the substrate.
- B. Removal and disposal of existing non-functional, water damaged, or otherwise deteriorated perimeter edge wood blocking.
- C. Removal and disposal of existing non-functional, water damaged, or otherwise deteriorated lightweight insulating fill.

1.02 SUBMITTALS

- A. Submit demolition and removal procedures and schedule under provisions of Division 1.
- B. Submit record documents under provisions of Division 1.

1.03 SEQUENCING AND SCHEDULING

- A. Sequence and schedule demolition work in accordance with the provisions of Section 013300, Administrative Provisions.
- B. Sequence and schedule work to accommodate Owner's use of premises.

1.04 EXISTING CONDITIONS

- A. Contractor is responsible for stability and safety of all existing structures within and adjacent to the Contractor's Scope of Work until demolition work is completed. Promptly repair or replace existing property damaged during the course of this Work to the original state at no extra cost to the Owner
- B. Conduct demolition to minimize interference with adjacent roofing, roof-mounted equipment, and roof deck and structure to remain, except as noted on Drawings.
- C. Provide, erect, and maintain temporary barriers and security devices.
- D. Conduct operations with minimum interference to public or private thoroughfares. Maintain egress and access at all times.
- E. Do not close or obstruct roadways or sidewalks without Owner's written consent.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that areas to be demolished are clear of encumbrances.
- B. Beginning of demolition means acceptance of existing conditions.
- C. Obtain and review the AISD record of asbestos containing materials prior to performing any demolition of existing roof related materials. Refer any requirements for the abatement of asbestos containing material to the AISD Project Manager.

3.02 PREPARATION

- ~~B.A.~~ Protect existing landscaping materials, appurtenances, structures, paving, roofing and siding, roof mounted equipment, roof deck and structure, which are not to be demolished.
- ~~C.B.~~ Verify abandoned equipment and penetrations to be removed and obtain written confirmation from Owner's representative prior to removal and repair of deck opening.

3.03 EXECUTION

- A. Evenly cut edges of existing materials that are to be expanded, replaced, or modified. Perform the Work to minimize wind-borne debris.
- B. Cease operations and notify Owner immediately if adjacent structures or materials appear to be endangered. Do not resume operations until corrective measures have been taken.
- C. Except when instructed otherwise, immediately remove demolished material from site daily.
- D. Remove materials to be re-installed or retained by Owner in a manner to prevent damage. Store and protect in accordance with Section 016000, Product Requirements.
- E. Do not burn or bury materials on site.
- F. Remove roofing, flashing, accessories, non-functional nailers and deck.
- G. Keep work sprinkled to minimize dust. Provide hoses and water main or hydrant connections for this purpose. Do not allow water to pond or saturate the deck. Monitor interior of space to ensure water does not enter building. Cease operations and mitigate infiltration immediately.

- H. Remove demolished materials from site daily as the work progresses. Keep the playgrounds and common areas free of debris at all times. Leave site in clean condition at the end of each work period.
- I. Remove only as much existing roof area as can be made watertight by the end of the work period. Consider the potential of rain events in scheduling the Work.
- J. Stop demolition work and notify the Owner and Roof Consultant immediately if suspected hazardous or unknown materials are encountered.
- K. Exercise care in demolition work to prevent damage to interior finishes.

END OF SECTION

SECTION 061050

ROUGH CARPENTRY

PART I - GENERAL

1.01 DESCRIPTION

- A. All materials and labor for work requiring new lumber such as nailers and curbs will be provided and installed by Contractor.

1.02 QUALITY ASSURANCE

- A. Rough Carpentry Lumber: Visible grade stamp of agency certified by SFPA.
- B. Provide Underwriters' Laboratories (UL) approved identification for fire resistant treated materials.

1.03 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Division 1.
- B. Indicate materials, fastening methods, accessories, and locations.
- C. Submit manufacturer's certifications under provisions of Division 1 that wood treatment is in accordance with applicable requirements.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Lumber: No. 2 Grade Yellow Pine, Standard Douglas Fir, Pressure Treated, KDAT 19%.
- B. Plywood: 1/2" exterior grade, fire retardant treated, 15% KDAT, meeting performance requirements of AWPA U1, Specification H for Use Category UCFB (fire protection, exterior, above ground) and AWPA C20/C27 (Exterior Type).

2.02 WOOD TREATMENT

- A. Wood Preservative (Pressure Treatment): Shop pressure treatment using waterborne preservatives; 0.25 pounds per cubic foot of preservative, kiln dried after treatment (KDAT) to maximum 19 percent moisture content, meeting Federal Specification TT-W-550, or the latest Federal approval for wood preservative pressure treatment.

2.03 SCHEDULE OF FASTENERS

- A. Fasteners – General:
 - 1. All exposed fasteners shall be hot dip galvanized or stainless steel with bonded neoprene washers.

2. Fasteners shall be compatible with all materials to which they come in contact so that dielectric corrosion does not occur.
- B. Wood Nailer Fasteners:
1. Wood Substrate: Hot dip G90 galvanized, common nails, gauge and length to suit application and as necessary to penetrate underlying wood support members a minimum of 1-1/4 inch. Each nail to have a minimum pull out resistance of 100 pounds.
 2. Metal Substrate: A No. 12 Factory Mutual approved, fluorocarbon coated roofing screw.
 3. Concrete or masonry surfaces: Stainless steel anchor with expansion shank, length as recommended by manufacturer for minimum 1,000 pound pull-out resistance.
 4. Tectum substrate: glass-filled nylon auger fastener.
 - a. OMG Polymer GypTec
 - b. Trufast TL
 - c. Pre-bid approved equivalent.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Verify mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.
- C. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

- A. Before installation, prime paint wood surfaces of items or assemblies to be in contact with cementitious materials.

3.03 INSTALLATION

- A. Set and secure materials and components in place, plumb, and level.
- B. Install components with approved fasteners suited to materials.
- C. Wood Nailer Installation: Attach nailers to wood substrates with two rows of appropriate fasteners on 12-inch centers, or as shown in Drawings. Offset fasteners from underlying wood nailer fasteners.

END OF SECTION

SECTION 070150

PREPARATION FOR ROOFING AND DECK REPAIR

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Preparation for roofing.
 - 2. Repair of damaged or otherwise non-functional roof deck.
 - 3. Filling in lightweight insulating fill deck low spots.

1.02 RELATED WORK

- A. Section 024100 – Demolition
- B. Section 061050 – Rough Carpentry
- C. Section 072200 – Roof and Deck Insulation
- D. Section 075419 – Polyvinyl-Chloride (PVC) Roofing
- E. Section 076000 – Flashing and Sheet Metal

1.03 SEQUENCING AND SCHEDULING

- A. Sequence and schedule work to accommodate Owner's use of premises.

1.04 EXISTING CONDITIONS

- A. Provide, erect, and maintain temporary barriers and security devices.
- B. Conduct operations with minimum interference to public or private thoroughfares. Maintain egress and access at all times.
- C. Do not close or obstruct roadways or sidewalks without Owner's written consent.
- D. Coordinate with AISD Service Center to locate abandoned/unused rooftop equipment and penetrations within scope of Work. Remove and dispose all abandoned/unused rooftop equipment and penetrations, repair deck per Contract Documents.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Lightweight Insulating Fill Deck Repair: for repairing surface damage, rough cold joints, fastener holes, and any other miscellaneous damage in existing lightweight insulating fill substrates:

1. Repairs up to 2" thick: Siplast Zono-Patch or approved equivalent.
 2. Repairs greater than 2" thick: Siplast NVS Pre-Mix or approved equivalent.
- B. Tectum deck repair: repair damaged Tectum deck with in-kind Tectum decking, in accordance with manufacturer's repair instructions. Match existing thickness and profile.
- C. Steel decks:
1. Sheet metal shall be 22 gauge galvanized steel sheet; size to cover openings an additional four inches on each side for unused penetration openings less than 12 inches in diameter or 12" square. For larger openings, install 22 gauge galvanized steel decking to match the existing corrugation.
- D. Filling lightweight insulating fill low spots: RoofSlope by PliDek.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Provide temporary plywood walkways for protection of roof surfaces that are used to transport material or workers, whether the roof surfaces are existing or new, within the roofing scope or not. Secure plywood walkways to prevent wind uplift. Protect piping, expansion joints, areas dividers, and other encumbrances in walkway paths with ramps.
- B. Protect existing membrane roofing system that is indicated not to be reroofed.
1. Loosely lay 1-inch- minimum thick, molded expanded polystyrene (MEPS) insulation over the roofing membrane in areas indicated. Loosely lay 15/32-inch plywood or OSB panels over MEPS. Extend MEPS past edges of plywood or OSB panels a minimum of 1 inch.
 2. Limit traffic and material storage to areas of existing roofing membrane that have been protected.
 3. Maintain temporary protection and leave in place until replacement roofing has been completed.
- C. Coordinate with Owner to shut down air intake equipment in the vicinity of the Work. Cover air intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
- D. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.
- E. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
1. If roof drains will be temporarily blocked or unserviceable due to roofing system removal or partial installation of new membrane roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit

water to enter into or under existing membrane roofing system components that are to remain.

- F. Verify that rooftop utilities and service piping have been shut off before commencing Work.

3.03 EXECUTION

- A. Evenly cut edges of existing materials that are to be expanded, replaced, or modified.
- B. Cease operations and notify Owner immediately if adjacent structures or materials appear to be endangered. Do not resume operations until corrective measures have been taken.
- C. If deck surface is not suitable for receiving new roofing, or if structural integrity of deck is suspect, immediately notify Architect/Roof Consultant and Owner. Do not proceed with installation until directed by Owner.
- D. Remove materials to be re-installed or retained by Owner in a manner to prevent damage.
- E. Keep work sprinkled to minimize dust. Provide hoses and water main or hydrant connections for this purpose. Do not allow water to pond or saturate the deck.
- F. Remove demolished materials from the roof as the work progresses. Overnight rooftop storage of demolished materials is prohibited. Keep all grounds adjacent to roofs within the Scope of Work free of roofing debris at all times. Leave site in clean condition.
- G. Stop demolition work and notify the Owner and Roof Consultant immediately if suspected hazardous or unknown materials are encountered.
- H. Exercise care in demolition work to prevent damage to interior finishes.

END OF SECTION

SECTION 072200

ROOF AND DECK INSULATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Roof and deck insulation.

1.02 RELATED WORK

- A. Section 061050 – Rough Carpentry
- B. Section 070150 – Preparation for Reroofing
- C. Section 075419 – Polyvinyl-Chloride (PVC) Roofing
- D. Section 076000 – Flashing and Sheet Metal

1.03 SYSTEM DESCRIPTION

- A. Install board insulation as required to achieve a complete and proper substrate for the roof membrane system.
- B. Insulation installed within the weatherproofed building interior shall contain No Added Urea Formaldehyde.
- C. All sealants, adhesives, coatings and sealant primers shall comply with SCAQMD rules 113 and 1168 as consistent with performance and warranty requirements.

1.04 REFERENCES

- A. ASTM International:
 - 1. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
 - 2. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics.
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.05 SUBMITTALS

- A. Submit manufacturer's installation instructions, samples and product data, in accordance with the provisions of Section 013300.
- B. Submit fastening pattern per deck type, include field, perimeter, and corner patterns.
- C. Submit scaled tapered insulation plans for all roof areas, include sumps and crickets.

- D. Submit Report of fastener pull-out testing performed by technical representative of the fastener manufacturer.
- E. Submit full thickness samples of each insulation board type and thickness.
- F. Submit manufacturer's certificate, in accordance with the provisions of Section 013300, that products meet or exceed specified requirements.
- G. Submit certification from roof membrane manufacturer that board insulation materials are acceptable for use with roof membrane materials.
- H. Submit product data from manufacturer showing insulation contains no added urea-formaldehyde.
- I. Submit product data and MSDS for all sealants, adhesives, coatings and sealants primers indicating the VOC content in g/l.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in accordance with the provisions of Division 1.
- B. Place insulation bundles on raised pallets or platforms at least 3 inches above ground and store flat. Place pallets on a finished surface other than dirt or grass.
- C. Cover with a waterproof, breathable cover such as a canvas tarpaulin. Manufacturer's transportation protective wrap is not an approved cover.
- D. Do not store polyiso roof insulation outdoors for more than two weeks prior to installation. If polyiso needs to be stored more than two weeks prior to installation, it shall be stored indoors in a dry, well ventilated warehouse, or in a dry, watertight, temporary storage container.

PART 2 - PRODUCTS

2.01 INSULATION MATERIALS

- A. Polyisocyanurate Insulation, closed cell foam core bonded to inorganic coated glass facers, ASTM C1289, Type II, Class 2, Grade 20.
- B. Tapered polyisocyanurate insulation, ASTM C1289, closed cell foam core bonded to inorganic coated glass facers, 1/8" per foot in the field, 1/2" per foot at crickets and sumps, starting thickness as shown in Drawings.
- C. Insulation shall contain no added urea-formaldehyde.
- D. Insulation Coverboard: 1/2" Densdeck Prime or Securock roof insulation coverboard.
- E. Fasteners:

1. Insulation Board: polymer coated case-hardened heavy duty steel screw with pre-assembled galvanized 3" diameter steel plate, from primary roofing materials manufacturer, or approved equivalent, length to penetrate steel deck 3/4" minimum, 1-1/4" maximum.
2. Fiberglass Venting Base Sheet: one-piece, dual pronged, coated G-90 galvanized steel, pre-assembled with a 2.75-in. diameter galvalume plate.

2.02 INSULATION MATERIAL ACCESSORIES

- A. Fiberglass Venting Base Sheet: ASTM D4897, Type II, UL Type G2, heavyweight venting base sheet, fiberglass mat coated with weathering-grade asphalt. Bottom surface embedded with mineral granules to enhance venting of vapor beneath base ply.
- B. Insulation and Coverboard Adhesive:
 1. Two-component low-rise polyurethane adhesive that is solvent free and VOC free, and contains no harmful HCFC or CFCs, as approved by the insulation and membrane manufacturer.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Prepare existing substrate to receive new roofing in accordance with Section 070150.
- B. Clean deck. If necessary, repair deteriorated or non-serviceable decking in accordance with Section 070150. Seal penetrations to prevent debris from entering building.

3.02 INSTALLATION

- A. Verify and document in Daily Report that the existing deck/substrate is functional, substrate is intact, and repairs have been made. Verify insulation board is free from moisture and suitable as substrate for roof membrane.
- B. Mechanically fasten fiberglass venting base sheet to existing lightweight insulating fill deck in accordance with the following minimum specified wind uplift pressures:
 1. Field: 60 psf
 2. Perimeters: 60 psf
 3. Corners: 90 psf
- C. Mechanically fasten base layer of insulation board to existing steel decks in accordance with the following minimum specified wind uplift pressures:
 1. Field: 60 psf
 2. Perimeters: 60 psf
 3. Corners: 90 psf
- D. Install base layer insulation to fiberglass venting base sheet at lightweight insulating fill decks, and subsequent layers of tapered insulation system and coverboard at all decks in low rise adhesive. Adhesive ribbons shall be spaced at a maximum of 6" o.c., extending to within 2" of board edges, to provide proper adhesive coverage to meet the specified uplift resistance and prevent edge curling of boards. Do not allow

adhesive application to precede the board placement by more than three board lengths. Firmly press each insulation board into adhesive by “walking-in” each board immediately after placement. Set weighted buckets at the edges of each board after placement. Leave buckets in place until adhesive has fully set, ten (10) minutes minimum.

- E. Coordinate installation of roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 - 1. At end of each day's work, provide tie-offs to cover exposed roofing membrane sheets and insulation in accordance with roof membrane manufacturer's instructions, with joints and edges sealed.
 - a. Do not trim all layers of insulation to be even at tie-offs. Use loosely set sections that can be removed with the tie-off to allow staggered insulation layers to continue.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
 - 3. Remove and discard temporary seals before beginning work on adjoining roofing.
- F. If substrate conditions prevent the specified system from achieving minimum slope indicated on drawings, Contractor shall notify Roof Consultant prior to proceeding with installation that will result in less than the minimum specified slope.
- G. Stagger end joints in adjacent boards. Stagger successive layers 24 inches in both vertical and horizontal directions.
- H. Butt edges for snug contact. Repair voids greater than 1/4" wide by filling with like material.
- I. If substrate conditions prevent the specified system from achieving minimum slope indicated on drawings, Contractor shall notify Roof Consultant prior to proceeding with installation that will result in less than the minimum specified slope.

END OF SECTION

SECTION 075419

POLYVINYL-CHLORIDE (PVC) ROOFING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. 80-mil reinforced PVC-KEE fleeceback roof membrane and membrane flashings, fully adhered, full coverage adhesive application, all roof membrane seams heat welded.
- B. Roof system shall meet the minimum requirements for the City of Austin current, applicable building codes, meet requirements of a UL Class A Fire Rated Assembly, and qualify for roof membrane manufacturer's 20-Year No Dollar Limit (NDL) Roof System Guarantee.

1.02 DESCRIPTION

- A. Section 018113 – Sustainable Construction Requirements
- B. Section 061050 – Rough Carpentry
- C. Section 070150 – Preparation for Reroofing
- D. Section 072200 – Roof and Deck Insulation
- E. Section 076000 – Flashing and Sheet Metal

1.03 EXTENT OF WORK

- A. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of the specified roof system, including flashings and insulation as specified and as indicated on the Drawings in accordance with the manufacturer's most current specifications and details.
- B. Contractor shall be fully knowledgeable of all requirements of the Contract Documents and shall be fully aware of all existing job site conditions that will affect their work prior to commencing with the Work.

1.04 SUBMITTALS

- A. Prior to starting work, the Contractor must submit the following in accordance with Section 013300:
 - 1. Shop drawings of details that differ from those shown in the Drawings, indicating details of construction and identification of materials.
 - 2. Sample of the manufacturer's 20-Year NDL Membrane System Warranty, and copy of the Application for Warranty.
 - 3. Copy of Project Information Notice submitted to manufacturer.

4. Letter of project-specific certification from the manufacturer, listing all layers of the new roofing assembly with required number of fasteners to achieve the specified uplift requirements.
 3. Letter of contractor certification from the manufacturer, which certifies the Contractor is authorized to install the manufacturer's 20-Year No Dollar Limit Guaranteed Roof Systems, with the date of original certification and a list of Contractor personnel who have received training from the manufacturer along with the dates training was received.
 4. Membrane Certification from the membrane manufacturer indicating the membrane thickness over the reinforcing scrim (top ply membrane thickness) is nominal .030" (30-mil).
 5. Executed copy of the Energy Rebate Application to Austin Energy.
 6. Submit product data and MSDS for all sealants, adhesives, coatings and sealant primers, indicating the VOC content in g/l of each product.
- B. Copies of all Permits required by the City of Austin or other applicable governmental jurisdiction, or a notarized letter stating that no permits are required.
- C. Upon completion of the installed work, submit:
1. Copies of the manufacturer's final inspection to the Roof Consultant prior to the issuance of the manufacturer's warranty.
 2. Certificates of Occupancy or "Green Tags" from the applicable governmental jurisdiction, if Permits are required.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the job site in the manufacturer's original, unopened containers or wrappings with the manufacturer's name, brand name and installation instructions intact and legible. Deliver in sufficient quantity to permit work to continue without interruption.
- B. No overnight rooftop storage will be permitted.
- C. Store all rolled goods and curable materials in lockable weathertight storage containers.
- D. Store curable materials (adhesives and sealants) between 60 degrees F and 80 degrees F in dry areas protected from water and direct sunlight. If exposed to lower temperature, restore to 60 degrees F minimum temperature before using.
- E. Store materials containing solvents in dry, well-ventilated spaces with proper fire and safety precautions. Keep lids on tight. Use before expiration of their shelf life.
- F. Any materials which are found to be damaged shall be removed and replaced at the applicator's expense.

1.06 WORK SEQUENCE

- A. Schedule and execute work to prevent leaks and excessive traffic on completed roof sections. Care should be exercised to provide protection for the interior of the

building and to ensure water does not flow beneath any completed sections of the membrane system.

- B. Do not disrupt activities in occupied spaces.

1.07 EXISTING CONDITIONS

- A. If discrepancies are discovered between the existing conditions and those noted in the Contract Documents, immediately notify Owner and Consultant by phone and solicit the manufacturer's approval prior to commencing with the Work. Necessary steps shall be taken to make the building watertight until the discrepancies are resolved.

1.08 JOB SITE PROTECTION

- A. Do not overload any portion of the building, either by use of or placement of equipment, temporary storage of debris, or storage of materials.
- B. Protect against fire and flame spread. Maintain proper and adequate fire extinguishers.
- C. Take precautions to prevent drains from clogging during the roofing application. Remove debris at the completion of each day's work and clean drains.
- D. Prior to Substantial Completion, coordinate and schedule with Owner and Consultant, roof drain testing to ensure the system is free running and drains are watertight. Remove strainers and plug drains to test for a minimum of 24 hours, verify that there will be 0% chance of precipitation during the 24 hour test. Be prepared to dispatch Contractor personnel to site to remove plugs in the event precipitation occurs at the site during the test. Install flags or other telltales on plugs. Remove plugs immediately after test has been documented.

1.09 WORKMANSHIP

- A. Applicators installing new roof, flashing and related work shall be factory trained and approved by the manufacturer they are representing.
- B. All work shall be of highest quality and in strict accordance with the manufacturer's published specifications and to the Owner's and Roof Consultant's satisfaction.
- C. There shall be a qualified, non-working English speaking supervisor on the job site at all times while work is in progress.

1.10 QUALITY ASSURANCE

- A. Unless otherwise noted in this specification, the Contractor must strictly comply with the manufacturer's current specifications and details.
- B. The roofing system must be installed by an applicator authorized and trained by the manufacturer in compliance with shop drawings as approved by the manufacturer.

- C. Provide adequate number of experienced workmen regularly engaged in this type of work who are skilled in the application techniques of the materials specified.
- D. Provide at least one thoroughly trained and experienced, non-working, English speaking superintendent on the job at all times that Work of this Contract is in progress.
- E. There shall be no deviations made from this specification or the approved shop drawings without the prior written approval of the Roof Consultant and Owner. Any deviation from the manufacturer's installation procedures must be supported by a written certification on the manufacturer's letterhead and presented for the Roof Consultant's consideration.
- F. Before commencement of the roof construction, the Contractor shall arrange for inspections to be made by a non-sales technical representative of the membrane manufacturer, as follows:
 - 1. On the first day of roof membrane installation,
 - 2. A minimum of three (3) interim inspections,
 - 3. A final inspection in order to determine whether corrective work will be required before the warranty will be issued.
 - 4. Notify the Roof Consultant seventy-two (72) hours prior to the manufacturer's inspections, and coordinate the inspection visits to coincide with visits by the Roof Consultant.
 - 5. Provide copies of the membrane manufacturer's inspection reports to the Owner and Consultant within five business following manufacturer's inspection.
- G. Pre-installation Conference: Conduct conference at Project site. Comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:
 - 1. Meet with Owner, Architect, Roof Consultant, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 5. Review structural loading limitations of roof deck during and after roofing.
 - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 - 7. Review governing regulations and requirements for insurance and certificates if applicable.
 - 8. Review temporary protection requirements for roofing system during and after installation.
 - 9. Review roof observation and repair procedures after roofing installation.

1.11 JOB CONDITIONS, CAUTIONS, AND WARNINGS

- A. Material Safety Data Sheets (MSDS) must be on location at all times during the transportation, storage and application of materials.
- B. When positioning membrane sheets, exercise care to locate all field splices away from low spots and out of drain sumps. All field splices should be shingled to prevent bucking of water.
- C. When loading materials onto the roof, take care not to overload the roof structure. Coordinate with Owner and do not overload or damage the building structure.
- D. Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.
- E. Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage.
- F. Provide protection for all roof areas exposed to traffic during construction. Protection shall consist of ¾" insulation board underneath 5/8" plywood. Do not allow plywood to contact new roof membrane.
- G. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.
- H. New roofing shall be complete and weather tight at the end of the workday.
- I. Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane.

1.12 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.
 - 1. Corner Uplift Pressure: 90 lbf/sq. ft.
 - 2. Perimeter Uplift Pressure: 60 lbf/sq. ft.

3. Field-of-Roof Uplift Pressure: 60 lbf/sq. ft.
4. Hail Resistance: SH

PART 2 - PRODUCTS

2.01 GENERAL

- A. All components of the specified roofing system shall be products of pre-bid approved manufacturers or accepted by manufacturers the as compatible.
- B. All products (including insulation, fasteners, fastening plates and edgings) must be manufactured and supplied by the roofing system manufacturer and covered by the warranty. Any products required by the Project not manufactured by the roofing system manufacturer shall be approved for use, in writing, by the roofing systems manufacturer.

2.02 MEMBRANE

- A. PVC Keytone Ethylene Ester (KEE) - Alloy Sheet: ASTM D4434, Type III, with fabric backing.
 1. Membrane thickness: 80-mils
 2. Exposed Face Color: white, minimum solar reflectance of 0.70, and minimum Solar Reflectivity Index (SRI) of 78.
 3. Minimum thickness above reinforcement: 30 mils.

2.03 MANUFACTURERS

- A. Carlisle SynTec
- B. GAF
- C. Johns Manville
- D. Siplast
- E. Versico
- F. Approved equivalent

2.04 ADHESIVES AND CLEANERS

- A. All products shall be furnished by the pre-bid approved manufacturer and specifically formulated for the intended purpose.

2.05 ACCESSORIES

- A. Bonding Adhesive: high-strength, solvent based contact adhesive that allows bonding of PVC membrane to various porous and non-porous substrates, as manufactured or approved by membrane manufacturer.

- B. Edge Sealant: membrane manufacturer's cut edge sealant.
- C. Sealer: membrane manufacturer's water cut-off mastic and sealant.
- D. Cleaner: membrane manufacturer's weathered membrane cleaner.
- E. Walk Tread: membrane manufacturer's standard.
- F. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, and color as PVC sheet, minimum 60-mils.
- G. Prefabricated Flashings and Accessories: as manufactured by roof membrane manufacturer.

2.06 FASTENERS AND PLATES

- A. Membrane Fasteners: An oversized diameter (.315") non-corrosive steel threaded fastener used in conjunction with heavy-duty plates for membrane securement into deck as required.

2.07 METAL EDGING AND MEMBRANE TERMINATIONS

- A. Termination Bar: A 1-inch wide and .098-inch-thick extruded aluminum bar pre-punched 6 inches on center; with and without sealant ledge to support lap sealant.
- B. PVC-Coated Metal: manufacturer's standard 24 gauge, G-90 galvanized steel sheet.

PART 3 - EXECUTION

3.01 GENERAL

- A. Inspect the deck and verify it's preparation to provide an acceptable surface for the installation of the membrane system.
- B. Comply with the manufacturer's published instructions for the installation of the membrane roofing system including proper substrate preparation, jobsite considerations and weather restrictions.
- C. Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.

3.02 MEMBRANE PLACEMENT AND ATTACHMENT

- A. Unroll and position membrane without stretching. Allow membrane to relax minimum 15 minutes if temperature is above 55 degrees Fahrenheit; allow to relax minimum 30 minutes if temperature is below 55 degrees Fahrenheit. Provide and secure both perimeter and field membrane sheets in accordance with the manufacturer's most current specifications and details.

- B. Position membrane over the acceptable substrate. Fold membrane sheet back lengthwise (onto itself) so half the underside of the membrane is exposed.
- C. Apply full coverage bonding adhesive in accordance with the manufacturer's published instructions, to the corresponding substrate area. Do not apply bonding adhesive along the splice edge of the membrane to be hot air welded over the adjoining sheet. Allow the adhesive to dry until it is tacky but will not string or stick to a dry finger touch.
 - 1. Install the membrane into the adhesive while avoiding wrinkles. Roll the membrane immediately into the adhesive with a 150 lb., 24" diameter roller to achieve maximum contact.
 - 2. Fold back the un-bonded half of the sheet lengthwise and repeat the bonding procedures.
- D. Position adjoining sheets to allow a minimum overlap of 2 inches.
- E. Clean laps with manufacturer's membrane cleaner prior to hot air welding.
- F. Prior to hot air welding, perform peel test on new membrane in accordance with manufacturer's requirements, documenting proper heat welding. Apply date, time, and name of person performing test to the test strip and submit to Roof Consultant for observation.
- G. Hot air weld all membrane sheet laps in accordance with the manufacturer's hot air welding procedures.
- H. Continue to install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches and complete the bonding procedures as stated previously, in accordance with the manufacturer's specifications.

3.03 MEMBRANE SPLICING/HOT AIR WELDING PROCEDURES

- A. Hot air weld the membrane using an automatic hot air welding machine in accordance with the manufacturer's specifications. At all splice intersections, roll the seam with a silicone roller prior to membrane seam cooling. Hot air weld non-reinforced flashing over splice intersection.
- B. Probe all seams once the hot air welds have thoroughly cooled (approximately 30 minutes). Include name of person performing daily probing and evidence that probing was performed in Contractor's Daily Report.
- C. Repair all seam deficiencies the same day they are discovered.
- D. Apply cut edge sealant on all cut edges of reinforced membrane (where the scrim reinforcement is exposed) after seam probing is complete.

3.04 WALKWAYS

- A. Install walkways at all traffic concentration points (such as access doors, HVAC units, roof ladders, rooftop hatches) and all locations as required by the membrane manufacturer, Owner and Consultant.
- B. Hot air weld walkway pads to the membrane in accordance with the manufacturer's specifications.

3.05 DAILY SEAL

- A. When the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.
- B. Complete a watertight membrane seal in accordance with the manufacturer's requirements.

3.06 CLEAN UP

- A. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
- B. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.
- C. Remove all excess adhesive from roof surfaces and adjacent surfaces.
- D. Power-wash all roof membrane surfaces in accordance with roof membrane manufacturer's requirements.

END OF SECTION

SECTION 077200

ROOF ACCESSORIES

PART 1 - GENERAL

1.01. WORK INCLUDED

- A. Equipment, pipe/conduit, and duct supports.
- B. Factory-fabricated fixed roof hatch fall protection safety guard rail in accordance with OSHA fall protection regulations (29 CFR 1910.23).
- C. Factory fabricated wall mounted roof access ladders.

1.02. SUBMITTALS

- A. Product Data: Submit for all products proposed for use, describing physical characteristics and method of installation.
- B. Shop Drawings: Show installation layout, sizes of units, and details of installation.
- C. Warranty: Submit executed copy of manufacturer's standard warranty.

1.03. QUALITY ASSURANCE

- A. Manufacturer: A minimum of 5 years' experience manufacturing similar products.
- B. Manufacturer's Quality System: Registered to ISO 9001:2008 Quality Standards including in-house engineering for product design activities.

1.04. DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.05. WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 – PRODUCTS

2.01 ROOF HATCH FALL PROTECTION SAFETY GUARD RAIL

- A. Basis-of-Design Manufacturer: Type Bil-Guard® 2.0 Roof Hatch Railing System by The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 800-366-6530, Web: www.bilco.com.
- B. Performance characteristics:
1. High visibility safety yellow powder coat paint finish.
 2. Hatch rail system shall attach to the cap flashing of the roof hatch and shall not penetrate any roofing material.
 3. Hatch rail system shall satisfy the requirements of OSHA 29 CFR 1910.23 and shall meet OSHA strength requirements with a factor of safety of two.
 4. Corrosion resistant construction with a five-year warranty.
 5. Hinged gate shall ensure continuous barrier around the roof hatch.
 6. Self-closing gate hinge and positive latching system provided with hatch rail system.
 7. Posts and Rails: 1-1/4" 6061 T6 schedule 40 aluminum pipe.
 8. Hardware: Mounting brackets shall be 3/8" thick extruded aluminum. Pivoting post guides with compression fittings and latching mechanism shall be cast aluminum.
 9. Self-closing hinges and all fasteners shall be type 316 stainless steel.

2.02 PIPE, CONDUIT, EQUIPMENT, AND DUCT SUPPORTS

- A. Manufacturer Basis of Design:
1. PHP Systems/Design i.e. Portable Pipe Hangers; 5534 Harvey Wilson Drive, Houston, Texas 77020, Tel: (800) 797-6585; www.phpsd.com; Email: info@phpsd.com.
- B. Applications:
1. Support pipes, conduit, cable trays, and ducting, a minimum of 8 inches above roof surface.
 - a. Support Spacing: 10 feet maximum.
 - b. For Electrical Conduit 2-1/2 inches in diameter or less, up to 10 inches above roof; Portable Pipe Hanger Model number SS8.
 - c. For Electrical Conduit 3-1/2 inches in diameter or less, up to 16 inches above roof; Portable Pipe Hanger Model number PP10.
 - d. For Gas Lines up to 6 inches in diameter, up to 12 inches above roof; Portable Pipe Hanger Model number RB18 with roller.
 - e. For single Electrical and Gas Lines 3 to 8 inches in diameter; Portable Pipe Hanger Model number PS 1-2.
 - f. For Multiple Lines: Portable Pipe Hanger Model number PSE custom.
 - g. For Ductwork: Portable Pipe Hanger Model number PPH-D – Goal Post style.
 - h. Accessories for PSE Custom and Other Applications when required.
 - i. Un-insulated Piping: Roller support or clevis hanger.
 - ii. Insulated Piping: Band hanger supported from horizontal channel or clevis hanger with Insulation Protection Shield.
 - iii. Conduit: Band hanger supported from horizontal channel.
 - iv. Bracing required when using base with swivel; when pipe exceeds 24 inches (610 mm) above roof, or when thermal expansion of pipe is great.

2. Equipment supports shall consist of Portable Pipe Hanger Model number RTU-20.
 - a. Support Spacing: Install supports at locations indicated on the Drawings.
- C. Portable Support System: Engineered, portable system specifically designed for installation without the need for roof penetrations, or flashings, and without causing damage to the roofing membrane.
 1. Design system using high density, high impact polypropylene bases with carbon black, anti-oxidants for UV protection, and steel framing of 1-5/8 inch (41 mm) B22TH or 1-7/8 inch (48 mm) BTS22TH for support.
 2. Custom design system to fit piping, conduits and, equipment to be installed and actual conditions of service and loading.
 3. Piping Supports: Provide suitable hangers and supports.
 4. Duct and Equipment Supports: Factory fabricated to support exact duct sizes and equipment to be installed.
- D. Bases: Injection molded high density, high impact polypropylene with UV-inhibitors and anti-oxidants, conforming to the following:
 1. Moisture Content: Negligible.
 2. Shrinkage/Swelling Due to Moisture: Negligible.
 3. Density: 55.8 lb/cu ft (894 kg/cu m).
 4. Insect Resistance: No known insect damage potential.
 5. Chemical Resistance (oil, brake fluid, gasoline, diesel, antifreeze, battery acid, and sulfuric acid) No visual or physical change apparent.
 6. Flammability: No ignition after 10 minutes, 25 kW/m, when tested in accordance with ASTM D 1929.
 7. Sized as required by loading conditions and as indicated on the drawings.
 8. Shop fabricated with inserts for square tubing or threaded rods as required.
 9. Color: Integral black color as molded.
 10. Bases for Mechanical Attachment: Sealant chamber around penetration point, with injection port for sealing after fastening; beveled lip for sealant bead around entire diameter.
 11. Do not use bases containing carbonated plastics, press molded recycled rubber and plastics, steel, stainless steel, or any injection molded threaded receivers.
- E. Pipe Supports and Hangers: Conform to MSS SP-58 and MSS SP-69 and as follows:
 1. Fabricated of carbon steel where framing is carbon steel; fabricated of stainless steel where framing is stainless steel; finished same as framing.
 2. Sizes 2-1/2 inch (63 mm) and smaller: Single roller supports for piping subject to expansion and contraction; 3-sided channels and pipe clamps.
 3. Sizes 3 inch (76 mm) and larger: Rollers, clevis hangers, or band hangers, to allow for expansion and contraction without movement of the bases or framing.
- F. Stainless Steel Framing:
 1. Channel Types: 1-5/8 inch (41.3 mm) or 1-7/8 inch (47.6 mm), as required for loading conditions.
 2. Thickness: 12 gage (2.7 mm).
 3. Form: Roll-formed 3-sided or tubular channel.
 4. Finish: Mill finish.
 5. Do not use tubing or tube steel.
- G. Accessories: Clamps, bolts, nuts, washers, and other devices as required for a complete system.
 1. Stainless Steel: Mill finish.

2.03 FACTORY FABRICATED ALUMINUM WALL MOUNTED ROOF LADDERS

- A. Aluminum Fixed Vertical Ladder and Components: Ladder, cage, rest platforms, wall mounting brackets, walk-thru, and side rails
- B. Basis of Design: Model FL Aluminum Fixed Vertical Ladder as manufactured by Precision Ladders LLC.
 - 1. Capacity: Unit shall support a 1000 lb loading without failure.
 - 2. Performance Standard: Units designed and manufactured to meet or exceed ANSI A14.3 and OSHA 1910.27.
- C. Components:
 - 1. Ladder Stringer: 2-1/2 inch by 1-1/16 inch by 1/8 inch extruded 6005-T5 aluminum channel. Pitch: 90 degrees.
 - 2. Ladder Tread: 2-1/4 inch by 3/4 inch by 1/4 inch extruded 6005-T5 aluminum with deeply serrated top surface.
 - 3. Ladder Mounting Bracket: 8-1/2 inch by 2 inch by 3 inch by 1/4 inch thick aluminum angle.
- D. Walk-Thru:
 - 1. Frame: 1-1/4 inch aluminum square tube.
 - 2. Mounting Brackets: 4 inch by 4 inch by 1/4 inch aluminum.
 - 3. Side Rails: 42 inch side rail extension for through ladder exits.
- E. Safety Cage:
 - 1. Bar Hoops: 1/4 inch by 2 inch 6005-T5 aluminum.
 - 2. Vertical Bars: 1/4 inch by 2 inch 6005-T5 aluminum.
- F. Rest Platform:
 - 1. 1/8 inch aluminum tread plate.
 - 2. Platform Size: 37-1/2 inches by 63 inches standard.
 - 3. Toe Boards. 6005 T-5 aluminum.
 - 4. Handrails: 1-2/4 inch aluminum square tube 42 inches high.
- G. Security Door: 0.125 inch 3003-H14 aluminum panel 84 inches tall with padlock provision.
- H. Finish: Mill finish on aluminum ladder components

PART 3 - EXECUTION

3.01 INSTALLATION – SUPPORTS

- A. Install in accordance with manufacturer's instructions.
- B. Clean surfaces of roof in areas to receive portable support bases.
 - 1. Remove dirt, dust, oils, and other foreign materials.
- C. Use care in handling portable support system components during installation, to avoid damage to roofing, flashing, equipment, or related materials.

- D. Pipe, Duct, Cable, and Equipment Support Systems
1. Locate bases and support framing as indicated on drawings and as specified herein. Provide complete and adequate support of all piping, ducting, and conduit; whether or not all required devices are shown.
 2. The use of wood for supporting piping is not permitted.
 3. Provide support spacing so deflection of piping does not exceed 1/240 of span.
 4. Install framing at spacing indicated, but in no case at greater than 8 feet on center.
 5. Accurately locate and align bases.
 - a. Consult manufacturer of existing or new roofing system as to the type of protection pads required between the roof and base.
 - b. Adhere bases to protection pads.
 6. Set framing posts into bases and assemble framing structure as indicated.
 7. Use galvanized fasteners for galvanized framing and stainless steel fasteners for stainless steel framing.
- E. Duct Support Systems
1. Locate bases and support framing as indicated on drawings and as specified herein. Provide complete and adequate support of all piping, ducting, and conduit, whether or not all required devices are shown.
 2. Accurately locate and align bases.
 - a. Consult manufacturer of existing or new roofing system as to the type of protection pads required between the roof and base.
 - b. Adhere bases to protection pads.
 3. Place pre-assembled support onto bases, attaching framing post to base bracket with 1/2 inch bolts provided, and adjust as needed. Support shall be adjustable to maintain existing elevation and slope.
 4. Use galvanized fasteners for galvanized framing and stainless steel fasteners for stainless steel framing.
- F. Equipment Supports
1. Locate bases and support framing as indicated on drawings and as specified herein. Provide complete and adequate support of all structures.
 2. Accurately locate and align bases.
 - a. Consult manufacturer of existing or new roofing system as to the type of isolation pads required between the roof and base.
 - b. Adhere bases to protection pads.
 3. Set legs of substructures into bases as indicated.

3.02 INSTALLATION – ROOF HATCH FALL PROTECTION GUARD RAILS

- A. Examination: Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Installation: Install products in strict accordance with manufacturer's instructions and approved submittals. Locate units level, plumb, and in proper alignment with adjacent work.
1. Test units for proper function and adjust until proper operation is achieved.
 2. Repair finishes damaged during installation.
 3. Restore finishes so no evidence remains of corrective work.

3.03 INSTALLATION – WALL MOUNTED LADDERS

- A. Examination: Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Installation: Install products in strict accordance with manufacturer’s instructions and approved submittals. Locate units level, plumb, and in proper alignment with adjacent work.

3.04 CLEANING AND PROTECTION

- A. Remove all packaging, unused fasteners, adhesive and other installation materials from the project site.
- B. Remove adhesive from exposed surfaces of supports and bases, and leave the work area in clean condition.
- C. Provide protection as required, leaving the work area in undamaged condition at the time of completion of work.

END OF SECTION

SECTION 076000

FLASHING AND SHEET METAL

PART I - GENERAL

1.01 WORK INCLUDED

- A. Install flashing and sheet metal as indicated on Drawings and in these specifications as required for a complete and proper installation. The following items are included:
 - 1. Perimeter edge flashing.
 - 2. Gutter and downspout.
 - 3. Expansion joint cap.
 - 4. Area divider cap.
 - 5. Rooftop equipment curb flashing and counterflashing.
 - 6. Through-wall flashing and counterflashing.
 - 7. Metal wall panels.

1.02 RELATED WORK

- A. Section 061000 – Rough Carpentry
- B. Section 072200 – Roof And Deck Insulation
- C. Section 075419 – Polyvinyl-Chloride (PVC) Roofing

1.03 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 013300.
- B. Describe material profile, jointing pattern, jointing details, fastening methods, and installation details.
- C. Submit samples under provisions of Section 013300.
- D. Provide full sized sample of metal flashing and post supports illustrating typical seam, external corner, internal corner, material, and finish.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA and NRCA standard details and requirement.

1.05 QUALIFICATIONS

- A. Company specializing in sheet metal flashing work with a minimum of 10-years documented experience.

1.06 STORAGE AND HANDLING

- A. Stack pre-formed materials to prevent twisting, bending, or abrasion, and to provide ventilation.
- B. Prevent contact with materials during storage that may cause discoloration, staining, or damage.
- C. Deliver materials to the job site in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label.

1.07 WARRANTY

- A. Sheet Metal work and accessories to be included in Two-Year Contractor's Warranty, Section 017836.

PART 2 - PRODUCTS

2.01 SHEET METALS

- A. Sheet metal flashing not exposed to public view: 24 gauge galvanized steel.
- B. Sheet metal flashing exposed to public view: pre-finished 24 gauge galvanized steel, Kynar 500.
- C. Sheet metal flashing embedded into roof membrane system: roof membrane manufacturer's 24 gauge galvanized steel, PVC coated to provide a surface acceptable for heat welding roof membrane and flashing.
- D. Sheet metal through-wall flashing: 24-gauge stainless steel.

2.02 SHEET METAL COMPONENTS

- A. Gutter and downspout: pre-finished 24-gauge galvanized steel.
- B. Cover plates, end caps and miscellaneous sheet metal: same materials, gauge and profile as edge metal.
- C. Cleats: 22 gauge galvanized steel.
- D. Wall panel: pre-finished 24-gauge galvanized steel, corrugated M-Panel.

2.03 ACCESSORIES

- A. Solder: ANSI/ASTM B 32 50/50 type.
- B. Blind Pop-Rivets: Stainless steel.
- C. Wall panel hat channels: 18-gauge G-90 galvanized steel, 1/2" tall, 2-1/2" wide top.

- D. Wall panel substrate waterproofing: minimum 40-mil thick self-adhering high temperature metal and tile modified bitumen waterproofing membrane.
- E. Wall panel substrate waterproofing membrane primer: waterproofing membrane manufacturer's approved primer.

2.04 SEALANT

- A. Type I: Application exposures to sunlight, ASTM C-920-87, Federal Specification TT-S-00230-C one component gun-grade polyurethane sealant suitable for continuous immersion and resistant to asphalt products.
- B. Type II: Applications not exposed to sunlight, butyl rubber based.
- C. Hot vent sealant: One-component neutral moisture curing silicone sealant.

2.05 SCHEDULE OF FASTENERS

- A. Exposed fasteners: stainless steel with stainless steel bonded neoprene or EPDM washers.
- B. Fasteners shall be compatible to all materials to which they come in contact.
- C. Non-exposed fasteners:
 - 1. Wood Substrate: No. 10 stainless steel wood screws of length necessary to penetrate wood substrate one inch.
 - 2. Metal Substrate: Minimum No. 10 stainless steel sheet metal screws or as necessary to suit application.

2.06 FABRICATION

- A. Form sections to match existing profiles, true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate continuous cleats and starter strips of same material as sheet, inter-lockable with sheet.
- C. Form pieces in longest practical lengths.
- D. Hem exposed edges of metal 1/2-inch; miter and seam corners.
- E. Form materials with cover plate seam.
- F. Fasten and seal metal joints.
- G. Fabricate corners from one piece with minimum 18-inch and maximum 36-inch long legs; fasten for rigidity, seal with sealant.
- H. Fabricate vertical faces with bottom edge formed outward 1/4-inch and hemmed to form drip.
- I. Form edge metal/fascia as existing profiles as specified herein and as shown on Drawings.

- J. Form sections square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- K. Enlarge holes for fastening counter flashing, coping, and pressure bars as necessary to allow for thermal expansion and contraction. Cover exposed holes with appropriate washers.
- L. All fabrication and installation of sheet metal shall be in accordance with the latest published SMACNA and NRCA guidelines and recognized roofing and sheet metal industry standards.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, and cant strips in place, and nailing strips located.
- B. Verify membrane termination and base flashings are in place, sealed, and secure.
- C. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

- A. Field measure site conditions prior to fabricating work.
- B. Tie-ins or contact with dissimilar metals: Install separation layer of elastomeric membrane between metal surfaces.

3.03 INSTALLATION - GENERAL

- A. Provide flashings of materials indicated on Drawings at all junctures of the roof with perimeters, curbs, mechanical, electrical equipment, etc., that a completely watertight installation is achieved.
- B. Fabricate and install sheet metal work with lines, arises and angles sharp and true, and plane surfaces free from warps and buckles. Bead or return all exposed edges. Tin metal for full area of contact on soldered seams and joints. Do soldering slowly with well heated coppers, thoroughly heating seams and completely filling them with solder.
- C. Apply bed of roof membrane manufacturer's water block mastic directly below sheet metal that is set over roofing membrane or in other areas as required by the Drawings, and the manufacturer's specifications.
- D. Submit details not covered in Drawings for approval by Owner or Roof Consultant.
- E. Install starter and edge strips, and cleats before starting installation.
- F. Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations approved by Roof Consultant.

- G. Lock and seal all joints.
- H. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- I. Fasten sheet metal with approved fasteners at a minimum of 12 inches on centers unless otherwise specified in these Specifications or the Drawings.

3.04 CLEAT INSTALLATION

- A. Install cleats for edge flashing with specified fasteners on eight-inch centers.

3.05 METAL EDGE FLASHING INSTALLATION

- A. Install edge flashing in a uniform application of water block mastic over roof membrane.
- B. Apply sealant, Type I, under cover plates at all joints prior to installation.
- C. Fasten horizontal flange in a staggered pattern on three-inch centers.
- D. Strip-in edge flashing and heat weld to PVC coated metal.

3.06 PLUMBING VENT SLEEVE

- A. Install manufacturer provided plumbing vent sleeves in accordance with manufacturer's installation instructions. Field fabricated plumbing vent sleeves are prohibited.
- B. Install top of sleeve in bed of water block mastic and wrap top of sleeve with stainless steel clamping ring. Seal the top of the clamping ring with manufacturer's sealant.

3.12 CLEANING

- A. Remove all stains and markings from exposed sheet metal.

END OF SECTION

SECTION 079000

JOINT SEALANTS

PART I - GENERAL

1.01 DESCRIPTION OF WORK

- A. Miscellaneous sealant work related to new roof system and flashing installation.

1.02 GENERAL PERFORMANCE

- A. Joint sealers are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognized limitations of wear and aging for each application. Failures of installed sealers to comply with this requirement will be recognized as failures of materials and workmanship.

1.03 SUBMITTALS

- A. Submit manufacturer's product specifications, handling/installation/curing instructions, and performance tested data sheets for each product required.

1.04 JOB CONDITIONS

- A. Do not proceed with installation of sealants under unfavorable weather conditions. Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer for installation.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Single component moisture cured urethane sealant suitable for exterior applications meeting the following criteria: ASTM C 920, Type S, Grade NS, Class 25, Use T, NT, M, A, G and O.
 - 1. Sonneborn NP-1
 - 2. Approved equivalent.
- B. Sealant primer: primer manufactured and supplied by sealant manufacturer for all substrates to receive sealant.
- C. Polyethylene bond breaker tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.
- D. Compressible backer rod stock of polyethylene foam, polyurethane foam polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable non-absorptive material as recommended by

sealant manufacturer for back-up of and compatibility with sealant. Where used with hot-applied sealant, provide heat-resistant type that will not be deteriorated by sealant application temperature as indicated.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Installer must examine substrates, (joint surfaces) and conditions under which joint sealer work is to be performed, and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.02 JOINT PREPARATION

- A. Clean joint surfaces immediately before installation of gaskets, sealants or caulking compounds. Remove all dirt, all old sealants, insecure coatings, moisture and other substrates that could interfere with seal of gasket or bond of sealant or caulking compound.
- B. Prime all surfaces to receive sealant, regardless of whether sealant manufacturer requires primer or not. Confine primer to areas of sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.03 INSTALLATION

- A. Comply with manufacturer's printed instruction except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.
- B. Set joint filler units at depth or position in joint as indicated to coordinate with other work, including installation of bond breaker, backer rod, and sealant. Do not leave voids or gaps between ends of joint filler units.
- C. Install sealant backer rod for liquid-applied sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for application indicated.
- D. Install bond breaker tape where required by manufacturer's recommendations to ensure that liquid-applied sealants will perform as intended.
- E. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

- F. Install liquid-applied sealant to depths as shown or, if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of beads; (not applicable to sealants in lapped joints):
 - 1. For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2" deep nor less than 1/4" deep.
 - 2. For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in range of 75% to 125% of joint width.
- G. Do not allow sealants or compounds to overflow from confines of joints, or to spill onto adjoining work, or to migrate into voids of exposed finishes. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

3.04 CURE AND PROTECTION

- A. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability. Cure and protect sealants in a manner that will minimize increases in modulus of elasticity and other accelerated aging effects. Replace or restore sealants that are damaged or deteriorated during construction period.

3.05 TESTING

- A. Contractor shall notify A/E when joint sealants have cured sufficiently to allow A/E to perform a minimum of three (3) pull tests, at locations selected by A/E.
- B. In the event that pull test results are not satisfactory, Contractor shall remove and replace failed sealants as directed by A/E, at no additional cost to Owner.

END OF SECTION

**SECTION 230501
INCIDENTAL MECHANICAL WORK**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Installation of temporary mechanical work, disconnects, reconnects, and other incidental mechanical and plumbing work, not specified herein but necessary for the successful execution of the Work as set forth in the Contract Documents.

PART 2 - PRODUCTS

2.1 MATERIAL AND WORKMANSHIP

- A. All materials and equipment required shall be:
 - 1. Installed by mechanics skilled in their trades, working under the direct supervision of competent experienced foremen or superintendents.
 - 2. Installed in compliance with all applicable Occupational Safety and Health Administration Rules and Regulations.
 - 3. Installed in compliance with all applicable local, Ventilating, Air Conditioning, and Plumbing Codes.
- B. Prior to conducting any mechanical work, perform a complete survey of all roof top mechanical equipment with the Owner's representative to verify the functional condition of the equipment. Document the survey in writing, signed by the Owner's representative and the Contractor. Provide a copy to the Roof Consultant.

2.2 TIMELY PLACEMENT OF MATERIALS AND EQUIPMENT

- A. Install items specified in Paragraph 2.1 of this Section at the proper time during progress of construction. Coordinate work operations with other trades as necessary.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install temporary mechanical work necessary to comply with the work of other Sections.
- B. Remove temporary mechanical work necessary to comply with other Sections at completion of Project and correct any damage to property.
- C. At the end of the Project, any non-functional mechanical equipment (not noted on the survey list) will be the responsibility of the Contractor to restore to functional working order.

END OF SECTION

**SECTION 260501
INCIDENTAL ELECTRICAL WORK**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. For those Projects requiring incidental Electrical Work: Included installation of temporary power, disconnects, reconnects, lightning arrestor systems, and other incidental electrical work necessary to perform the Work of the Contract Documents.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

- A. All materials and equipment required shall be:
 - 1. Approved by Underwriters Laboratories and so labeled.
 - 2. For wire and cable, marked as required by Article 310-1- National Electrical Code.
 - 3. Installed by mechanics skilled in their trades, working under the direct supervision of competent experience foremen or superintendents.
 - 4. Installed in compliance with all applicable Occupational Safety and Health Administration and applicable local electrical codes.
- B. Prior to conducting any electrical work, perform a complete survey of all roof top electrical lines and service with the Owner's representative to verify the functional condition of the electrical service. Document the survey in writing, signed by the Owner's representative and the Contractor. Provide a copy to the Roof Consultant.

2.2 TIMELY PLACEMENT OF MATERIALS AND EQUIPMENT

- A. Install items specified in Paragraph 2.1 of this Section at the proper time during progress of construction. Coordinate work operations with other trades as necessary.

PART 3 - EXECUTION

3.1 GENERAL

- A. Provide temporary electrical power as required to perform the Work of the Contract Documents.
- B. Remove all temporary electrical items at completion of Project and correct any damage to property.
- C. At the end of the Project, any non-functional electrical service (not noted on the survey list) will be the responsibility of the Contractor to restore to functional working order.

END OF SECTION