CITY OF LAGUNA HILLS

April 1, 2020

To all Bidders:

SUBJECT: ADDENDUM NO. 2 TO NOTICE INVITING BIDS AND SPECIFICATIONS FOR COMMUNITY CENTER HVAC AND ROOF REPLACEMENT PROJECT, CIP NO. 513-B

Bidder's shall take note of the following plan and specification revision for the subject project incorporated in this Addendum No. 2 and shall acknowledge receipt of this Addendum No. 2 by signing and returning this single page sheet with the Bid Proposal:

1. The roofing specifications are hereby clarified that the only roof type to be accepted is TPO, as more particularly specified in the attached revised Section 07 5400 - LHCC_Thermoplastic Membrane Roofing-REV.01-04-01-20 Specifications.

There is no change to the Bid Schedule. There is no change to the Bid Date or Time.

Bidder shall acknowledge this Addendum No. 2 by signing below and shall return this page with their Bid Proposal.

Sincerely,

Kenneth H. Rosenfield, P.E.
Assistant City Manager/
Public Services Director

BIDDER'S ACKNOWLEDGEMENT

_____ _____
Signature Date

_____
Bidder's Name

SECTION 07 5400

THERMOPLASTIC MEMBRANE ROOFING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes the following:

1. Adhered membrane roofing system.
2. Roof insulation.

1.02 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.03 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. FMG Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.

1. Fire/Windstorm Classification: Class 1A- 90.
2. Hail Resistance: MH.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Insulation fastening patterns.

C. Samples for Verification: For the following products:

1. 8-by-10-inch square of sheet roofing, of color specified, including T-shaped side and end lap seam.

2. 6-by-6-inch square of roof insulation.
3. 8-by-10-inch square of walkway pads or rolls.
4. 6-inch length of metal termination bars.
5. 6-inch length of battens.
6. Six insulation fasteners of each type, length, and finish.
7. Six roof cover fasteners of each type, length, and finish.

D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of meeting performance requirements.

F. Qualification Data: For Installer and manufacturer.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.

H. Research/Evaluation Reports: For components of membrane roofing system.

I. Maintenance Data: For roofing system to include in maintenance manuals.

J. Warranties: Special warranties specified in this Section.

K. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

B. Manufacturer Qualifications: A qualified manufacturer that has UL listing for membrane roofing system identical to that used for this Project.

C. Source Limitations: Obtain components for membrane roofing system from or approved by roofing membrane manufacturer.

D. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to Owner’s Representative. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

E. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Comply with requirements for preinstallation conferences in

Division 01 Section 013000, “Administrative Requirements." Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following:

1. Meet with Owner’s Representative, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, 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.

F. Preinstallation Conference: Conduct conference at Project site. Comply with requirements in Division 01 Section 013000, “Administrative Requirements." Review methods and procedures related to roofing system including, but not limited to, the following:

1. Meet with Owner’s Representative, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck installer, 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.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.

D. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.

E. As a general rule all adhesives shall be stored at temperatures between 40°F (4°C) and 80°F (27°C). Read instructions contained on adhesive canister for specific storage instructions.

F. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.

G. Any materials which the Owner’s representative or Roofing System Manufacturer representative determine to be damaged are to be removed from the job site and replaced at no cost to OWNER.

H. Safety Data Sheets (SDS) shall be available at the job site at all times.

I. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

J. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.07 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

B. Install only as much of the new roofing as can be made weathertight each day, including all flashing and detail work, shall be installed. All seams shall be heat welded before leaving the job site that day.

C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.

D. All surfaces to receive new insulation, membrane or flashings shall be dry. Should surface moisture occur, the Applicator shall provide the necessary equipment to dry the surface prior to application.

E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.

F. Uninterrupted waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner.

G. The Applicator is cautioned that certain TPO membranes are incompatible with asphalt, coal tar, heavy oils, roofing cements, creosote and some preservative materials. Such materials shall not remain in contact with TPO membranes. The Applicator shall consult manufacturer regarding compatibility, precautions and recommendations.

H. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Applicator shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.

I. Prior to and during application, all dirt, debris and dust shall be removed from surfaces by vacuuming, sweeping, blowing with compressed air or similar methods.

J. The Applicator shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.

K. All roofing, insulation, flashings and metal work removed during construction shall be immediately taken off site to a legal dumping area authorized to receive such materials. Hazardous materials, such as materials containing asbestos, are to be removed and disposed of in strict accordance with applicable City, State and Federal requirements.

L. All new roofing waste material (i.e., scrap roof membrane, release paper, empty cans of adhesive) shall be immediately removed from the site by the Applicator and properly transported to a legal dumping area authorized to receive such material.

M. The Applicator shall take precautions that storage and application of materials and equipment does not overload the roof deck or building structure.

N. Installation of a TPO membrane over coal tar pitch or a re-saturated roof requires special consideration to protect the membrane from volatile fumes and materials. Consult Roofing System Manufacturer for precautions prior to bid.

O. Flammable adhesives and deck primers shall not be stored and not be used in the vicinity of open flames, sparks and excessive heat.

P. All rooftop contamination that is anticipated or that is occurring shall be reported to Roofing System Manufacturer to determine the corrective steps to be taken.

Q. The Applicator shall verify that all roof drain lines are functioning correctly (not clogged or blocked) before starting work. Applicator shall report any such blockages in writing (letter copy to Roofing System Manufacturer) to the Owner Project Manager for corrective action prior to the installation of the roof system.

R. Applicator shall immediately stop work if any unusual or concealed condition is discovered and shall immediately notify Owner Project Manager of such condition in writing.

S. Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the Owner's satisfaction.

T. All landscaped areas damaged by construction activities shall be repaired at no cost to the Owner.

U. The Applicator shall conduct fastener pullout tests in accordance with the latest version of the SPRI/ANSI Fastener Pullout Standard to help verify condition of the deck/substrate and to confirm expected pullout values.

V. The TPO membrane shall not be installed under the following conditions without consulting Roofing System Manufacturer's Technical Dept. for precautionary steps:

1. The roof assembly permits interior air to pressurize the membrane underside.
2. Any exterior wall has 10 percent or more of the surface area comprised of opening doors or windows.
3. The wall/deck intersection permits air entry into the wall flashing area.

W. Precautions shall be taken when using adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Keep lids on unused cans at all times.

X. Protective wear shall be worn when using solvents or adhesives or as required by job conditions.

Y. TPO membranes are slippery when wet or covered with snow, frost, or ice. Working on surfaces under these conditions is hazardous. Appropriate safety measures must be implemented prior to working on such surfaces. Always follow OSHA and other relevant fall protection standards when working on roofs.

1.08 WARRANTY

A. Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that

fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, cover boards, substrate board, walkway products and other components of membrane roofing system.

    a. Warranty shall not be pro-rated over the warranty period.
    b. Warranty shall not exclude ponding water for the length of the warranty.

2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.
2. Or Equal: Where products are specified by manufacturer's name and accompanied by the term "or equal", comply with provisions in Division 01 Section 012500 "Substitution Procedures." Specific procedures must be followed before use of an unnamed product or manufacturer.

2.02 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing system and flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.

1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 (Roof Area Field): N/A
2. Zone 2 (Roof Area Perimeter): N/A
3. Zone 3 (Roof Area Corners): N/A

D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.

1. Fire/Windstorm Classification: Class 1A-90
2. Hail-Resistance Rating: FM Global Property Loss Prevention Data Sheet 1-34 -MH

E. SPRI's Directory of Roof Assemblies Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in SPRI's Directory of Roof Assemblies for roof assembly identical for that specified for this Project.

1. Wind Uplift Load Capacity: Not Available

F. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

G. Energy Performance: Roofing system shall have an initial solar reflectance of not less than 0.76 and an emissivity of not less than .90 when tested according to CRRC-1.

H. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

I. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.03 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

A. TPO Sheet: ASTM D6878/D6878M, internally fabric- or scrim-reinforced, self-adhering TPO sheet.

1. Section 2.04
2. Source Limitations: Obtain components for roofing system from roof membrane manufacturer
3. Thickness**:** 45 mils (1.1 mm).
4. Exposed Face Color: White

2.04 ROOFING MEMBRANE THERMOPLASTIC POLYOLEFIN – (TPO)

A. TPO Sheet: ASTM D 4434, Type III, fabric reinforced and fabric backed.

1. Manufacturers:
   a. GAF Inc.
   b. Sarnafil, Inc.

c. Tremco
d. Duro-Last Roofing, Inc.
e. Or equal.

2. Overall Thickness (ASTM D751): 45 mils, ±2 mils
3. Thickness Above Scrim (ASTM D751): 16 mils
4. Breaking Strength Machine Direction (ASTM D751) (lbf./in): 220
5. Elongation at Break, % Machine Direction & % Cross Machine Direction (ASTM D751): 15&15
6. Seam Strength, % of Original (ASTM D751): 66 lbf (Failure occurs through membrane rupture not seam failure)
7. Heat Aging Tensile Strength, % of Original (ASTM D751): 90
8. Heat Aging Elongation, % of Original (ASTM D751): 90
9. Tearing Resistance, lbf. (ASTM D1004): 55
10. Low Temperature Bend, -40deg. F (ASTM D2136): Pass
11. Accelerated Weather Test (Florescent Light UV Exposure) Cracking (7x magnification): None
12. Accelerated Weather Test (Florescent Light UV Exposure) Discoloration (by Observation): Negligible
13. Accelerated Weather Test (Florescent Light UV Exposure) Crazing (7x magnification): None
14. Linear Dimensional Change, % (ASTM D1204): 1% Max.
15. Weight Change After Immersion in Water, % (ASTM D570): +/- 3.0 max.
16. Static Puncture Resistance, lbf. (ASTM D5602): Not established
17. Dynamic Puncture Resistance, ft-lbf (ASTM D5635): 14.7
18. Exposed Face Color: White.

a. Initial Solar Reflectance Index (SRI): 100 minimum.

2.05 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

1. Liquid-type auxiliary materials shall meet VOC limits of South Coast Air Quality Management District (SCAQMD).

B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.

C. Bonding Adhesive: Manufacturer's standard water-based bonding adhesive for membrane, and solvent-based bonding adhesive for base flashings.

D. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

E. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

F. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.

G. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.

2.06 SUBSTRATE BOARDS

A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch thick.

1. Product: Subject to compliance with requirements, provide "Dens-Deck" by Georgia-Pacific Corporation, or equal (no known equal).

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening substrate panel to roof deck.

2.07 ROOF INSULATION

A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces.

1. Manufacturers:
   a. Johns Manville International, Inc.
   b. Dyplast Products.
   c. Celotex Insulation.
   d. GAFTEMP.
   e. Atlas Roofing Corporation.
   f. Or equal.

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches, unless otherwise indicated.

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

E. Properties:
1. Compressive Strength (ASTM D1621): 16 psi, min.

2. Dimensional Stability (Thermal and Humid Aging) (ASTM D2126)
   a. -4 deg. F, Amb RH: less than 2% linear change
   b. 158 deg. F, 97 % RH: less than 2% linear change
   c. 200 deg. F, ambient RH: less than 2% linear change
3. Flexural Strength (ASTM C203)
   a. Modulus of Rupture: 40 psi, min.
   b. Break Load: 17 psi, min.
4. Tensile Strength (Perpendicular to Surface) (ASTM C203): 500 psf, min.

2.08 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Cold Fluid-Applied Adhesive: Manufacturer's standard cold fluid-applied adhesive formulated to adhere roof insulation to substrate.

D. Cover Board: ASTM C 208, Type II, Grade 2, cellulosic-fiber insulation board, 1/4 inch thick.

E. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch thick.

1. Product: Subject to compliance with requirements, provide "Dens-Deck" by Georgia-Pacific Corporation, or equal (no known equal).

2.09 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads or rolls, approximately 96 mil thick, and acceptable to membrane roofing system manufacturer.

1. Color: Match roofing membrane color.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Notify Architect to observe the exposed existing roof sheathing. Damaged plywood shall be replaced, see Contract Drawings for allowances. Following removal of damaged sheathing, Architect shall be notified to observe the exposed structural framing.
2. Verify that substrate is clean, smooth, dry, free of flaws, sharp edges, loose and foreign material, oil and grease.

3. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
4. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
5. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.03 SUBSTRATE BOARD INSTALLATION

A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

1. Fasten substrate board to top flanges of steel deck according to recommendations in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
2. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturer's written instructions.

3.04 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 1/2 inches or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

G. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:

1. Set each layer of insulation in a cold fluid-applied adhesive per manufacturer's written recommendations.

H. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

I. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Stagger joints from joints in insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck.

1. Fasten according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
2. Fasten to resist uplift pressure at corners, perimeter, and field of roof.

3.05 MECHANICALLY FASTENED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.

1. Install sheet according to ASTM D 5082.

B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.

C. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

E. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

F. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
2. Verify field strength of seams a minimum of three times daily and repair seam sample areas.

3. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.

G. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.

H. In-Splice Attachment: Secure one edge of roofing membrane using fastening plates or metal battens centered within membrane splice and mechanically fasten roofing membrane to roof deck. Field-splice seam.

I. Through-Membrane Attachment: Secure roofing membrane using fastening plates or metal battens and mechanically fasten roofing membrane to roof deck. Cover battens and fasteners with a continuous cover strip.

J. Install roofing membrane and auxiliary materials to tie into existing roofing.

3.06 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply water-based bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with sheet flashing.

D. All flashings shall extend a minimum of 8 inches above the roofing level, unless noted otherwise and approved by roofing manufacturer.

E. All flashings that exceed 30 inches in height shall receive additional securement as indicated by roofing manufacturer.

F. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.

G. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.07 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.08 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Owner’s Representative.

C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.09 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Owner's Representative.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.10 ROOFING INSTALLER'S WARRANTY

A. WHEREAS the successful bidder herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: City of Laguna Hills
2. Building Name/Type: Community Center
3. Area of Work: As indictated on drawings.
4. Acceptance Date: TBD
5. Warranty Period: 20 years
6. Expiration Date: TBD

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer 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 a watertight condition.

D. 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;
   b. peak gust wind speed exceeding 90 mph;
   c. fire;

d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
f. vapor condensation on bottom of roofing; and
g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner's Representative.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to 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.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner's Representative in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate 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 on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with General Contractor.

END OF SECTION