ADDENDUM NO. B

April 23, 2019

BIDDING AND CONTRACT DOCUMENTS

FOR

West Lothian Roof Replacement
PROJECT NO. 956399
CONTRACT NO. 956399-LF-2019-96

The following changes, additions, or deletions shall be made to the following documents as indicated for this Project; and all other terms and conditions shall remain the same. Each bidder is responsible for transmitting this information to all affected subcontractors and suppliers before the Bid Deadline.

1. INFORMATION AVAILABLE TO BIDDERS

Revise Information Available to Bidders adding No. 3, The Garland Company Roof Asset Management Program Report.

END OF ADDENDUM

INFORMATION AVAILABLE TO BIDDERS

The following information is made available for the convenience of bidders and is not a part of the Contract. The information is provided subject to the provisions of Article 3 of the General Conditions.

1. The University of California has contracts for materials, equipment and/or services with the suppliers listed on the Office of the President Procurement Services website at: http://www.ucop.edu/procurement-services/for-suppliers/ucop-designated-construction-agreements.html

   General Contractors or others submitting bids for University construction projects may enter into agreements with these suppliers that utilize the pricing and terms contained in the University-supplier agreements. The university does not represent or warrant that materials/equipment/services of these suppliers meet the requirements of the University's construction contracts.

   Use of such suppliers shall not relieve Contractor from its obligation to meet all contractual requirements in any contracts with the University. The university will not be a party to any agreements with such suppliers and accepts no performance obligations or liability with respect to such agreements.

2. Reports: Ambient Environmental Inc., dated May 12, 2011, 4 pages.

3. ***Report: Garland Company Inc. Roof Asset Management Program, DKC Architects, April 19, 2019, 15 pages.***

END OF INFORMATION AVAILABLE TO BIDDERS

The Garland Company, Inc.

Roof Asset Management Program

RAMP®

UC Riverside, DKC Architects

Prepared By
Sean Jarvis

April 19, 2019

Table of Contents

Client Data

Client: UC Riverside

Client Data

Name	UC Riverside		
Address 1	3401 Watkins Dr		
City	Riverside	**State**	California
ZIP	92521	**Country**	United States

Construction Details

Client: UC Riverside

Facility: Lothian Hall

Roof Section: West Lothian Hall

Information

Year Installed	Unknown	**Square Footage**	18,000
Slope Dimension	1/4:12	**Eave Height**	30 Feet
Roof Access	Internal Roof Hatch	**System Type**	PUF

Assembly

Roof #	Layer Type	Description	Attachment	R-Value	Thickness
1	Deck	Concrete	Poured - in - place	-	-
1	System	Unknown	Unknown	-	-
1	Membrane	Sprayed in place polyurethane foam (PUF)	Spray applied	-	-

Details

Perimeter Detail	Parapet Wall, Metal Edge
Flashing Material	Sprayed Polyurethane Foam
Drain System	Internal Roof Drains
Parapet Wall	Poured In Place Concrete
Coping Cap	Concrete

Inspection Report

Client: UC Riverside

Facility: Lothian Hall

Report Date: 10/03/2018

Roof Section: West Lothian Hall

Inspection Information

Inspection Date	10/03/2018	**Core Data**	No
Inspection Type	Visual Inspection	**Leakage**	Yes
Deck Conditions	Unknown		

Flashing Conditions

Perimeter	Failed	**Wall**	N/A
Projections	Poor	**Counterflashing**	N/A

Miscellaneous Details

Reglets	N/A	**Debris**	Yes
Control Expansion Joints	Poor	**Ponding Water**	Substantial
Parapet Wall	Fair	**Coping Joints**	Fair

Perimeter

Rating	Failed
Condition	**Splits:** Membrane splits are usually caused by building movement, ridges, and expansion and contraction. Such movement can be caused by lack of attachment of one or more of the component parts of the roof system, or where the building itself generates movement. Weak or inflexible membranes reach a point where they cannot accommodate further movement. At this time the roof splits open. The open split allows water to enter the roofing system, saturating the insulation, and causes leaks into the building. The foam around the perimeter has been unable to withstand the expansion and contraction of the metal edge. Each overlap of the metal is causing too much stress on the foam which then splits. Each of these failures can cause severe leakage inside the building.

Field	
Rating	Failed
Condition	**Debris – Leafs and Pine Needles**: Pine needles and other leaves build up on the roof membrane causing plugged drains and scuppers thereby causing ponding water and structural weight loading. As the leaves and pine needles rot a "compost effect" occurs, this in effect causes soil to form on top of the roof membrane. This soil creates a perfect medium for plant and weed growth. When seeds take hold the roots will often penetrate through the membrane causing immediate leaks and damage internally. **Blisters**: Soft spongy pockets or swellings in the roofing material. They occur between layers of felt or between the roof membrane and substrate. Air or moisture vapor entrapped within a blister expands as the roof and outside air temperatures rise. This results in sufficient pressure to push the roofing felts upwards and apart. Blisters may be ruptured by roof traffic, expanding frozen water, or hail (especially during colder weather). Some blisters may become so large as to affect drainage, which may then cause ponding water. Laps could also be pulled apart, resulting in leakage. A ruptured blister will immediately allow water to penetrate and damage the roof system. Once these dozens of foam blisters popped they allowed moisture underneath the system and rendered the foam useless.

Penetrations	
Rating	Poor
Condition	**Pitch Pockets**: Typically metal enclosures that surround continuous or odd shaped penetrations that create challenges with regard to proper flashing details. Typical seasonal movement from the protrusion can create breaks in the waterproofing compound, creating cracks. Over time, the release of solvents from the compound can cause the material to shrink, leaving gaps along the edges of the pan and around structural support. Moisture can enter through a defective pitch pan and pitch pan sealant, finding its way into the roof system and the buildings interior. Pitch pockets require a high level of maintenance and inspection. **Pitch Pocket Deterioration:** Metal protrusions that penetrate the roof system to allow conduits to run from the rooftop into the building. Movement from the protrusion can break the waterproofing compound, creating cracks. Over time, the release of solvents from the compound can cause the material to shrink, leaving gaps along the edges of the pan and around structural support. Water can enter through a defective pitch pan and find its way into the interior of the building. Moisture can also penetrate into the roof system leading to premature failure.

Drainage	
Rating	Poor
Condition	The roofing system currently relies on small amounts of slope and internal drains to remove moisture from the system. Throughout all 180 square there are 6 internal drains. During rain storms the drains are unable to carry moisture sufficiently to the drains and as a result the system ponds water for a substantial amount of time thereafter. As moisture sits on the system it acts as a prism to speed up the aging process and damage the membrane.

Overall	
Rating	Failed
Condition	The existing system is a sprayed in place polyurethane foam roof tinted red over a concrete deck and what is presumed to be a failed multi-ply BUR system. The slope from the foam is negligible and the deck cannot be verified for slope at this time. Sprayed in place foam or PUF systems have a rather dubious track record in regards to long term roof applications. The Army Corps of Engineers published a study on PUF systems. The study showed the good performance and isolative qualities of the PUF system as tested. The caveat stated in the study was the crucial nature of the application, and the constant need for continued and successive recoating of the system. Because the system is a two component system that is mixed at the tip, the viscosity of each component needs to remain constant to allow for proper component percentage to control the foams expansion and density. As the study points out, by simply having a one foot section of the hose run through a shaded area the temperature and viscosity would change enough to compromise the mixture. Additionally the study noted the problem with application while winds exceed 12 mph and the detrimental effects on the application and finish. The NRCA is clear about acceptable finish textures and ponding water on this system. Both of these situations exist and are attributing to the failing performance of this system. Degradation from UV and moisture intrusion was evident. 4% moisture content by volume will reduce the thermal resistance (R-Value) by 70%. There is certainly well over 4% based on my observations. It was noted that a number of splits, blisters and cracks were found in the membrane and at the perimeter. PUF applications require a minimum 1/4" per foot slope. There was no definable or consistent slope in this roof primarily due to the inconsistent expansion of the two component foam. On site personnel maintain that the system holds vast amounts of moisture after rain storms. Without proper drainage and slope this system was always doomed to fail. The solar array only complicates the issue as it requires dozens of pitch pocket penetrations. The pitch pockets were then flashed with the foam and created more unevenness throughout the system as it raised membrane heights randomly across the building. The current roofing system is clearly in a failed state and it is recommended that a new system be installed. Given the type of building (Dorm) and desire to add a new ballasted or mechanically attached solar array it is suggested by Garland that a multi-ply roofing system similar to what was installed on East Lothian Hall also be used on West Lothian Hall. The multi-ply system will carry a 30-Year NDL warranty and several layers of protection which will be crucial on this project. Solar arrays require maintenance of the panels which are in turn laid on the membrane along with other heavy equipment and tools. It is very common for punctures and tears to occur on some systems during this time and would permanently damage the above deck insulation if it were to leak. The tapered insulation and associated R-Value remain functional only when free of moisture. If the insulation becomes damp from

moisture intrusion it will never dry out and cease to provide any R-Value. It could also cause the insulation to sag and compress, creating pockets for moisture to collect within before being able to drain.

The new proposed system would consist of tapered insulation over the concrete with a gypsum or fiberboard for compression strength. Felt plies and a modified mineral surface cap sheet coated with a Title 24 reflective coating would then be installed over the insulation. Some areas around the drainage would receive an additional urethane coating to protect against any standing water. The most cost-effective application adhesive is hot asphalt, but other alternatives such as cold adhesive, self-adhering, or torch systems are available as well. A comprehensive design aiming to minimize failures will further protect the system from failure and the building from moisture intrusion. Garland would provide the engineering on site specific wind up lift calculations for proper attachment of the membrane and any metal coping or edge metal. The project would be monitored daily by a full-time employee of the Garland Company to ensure all aspects of the project are per the specifications, including the material, labor quality and contractor responsibilities. Daily electronic reports would be sent to all relevant parties to ensure constant communication throughout the project. Upon completion Garland would provide a 30-Year NDL Watertight warranty.

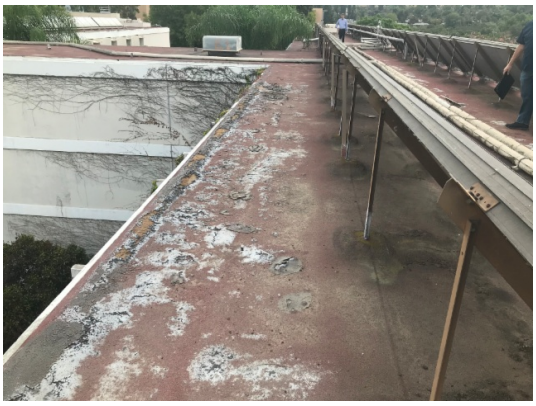

Photo 1

The foam membrane around the perimeter has failed.

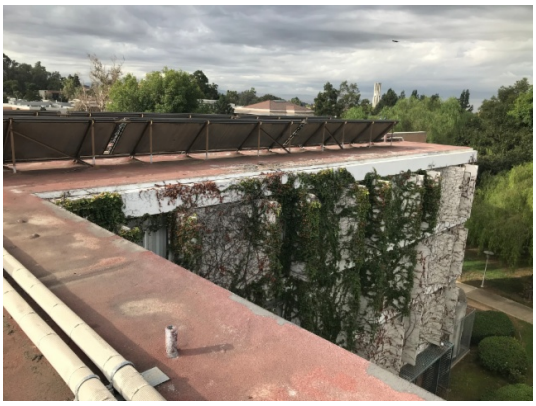

Photo 2

Overview.

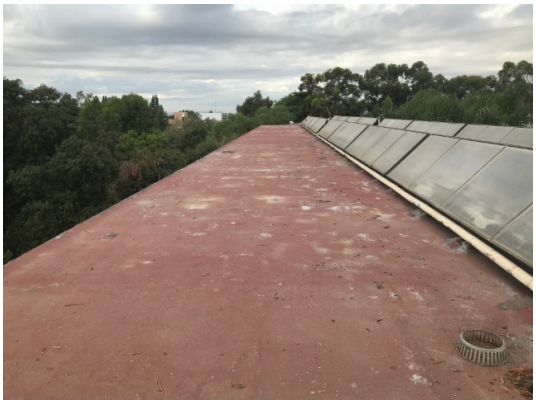

Photo 3

Overview.

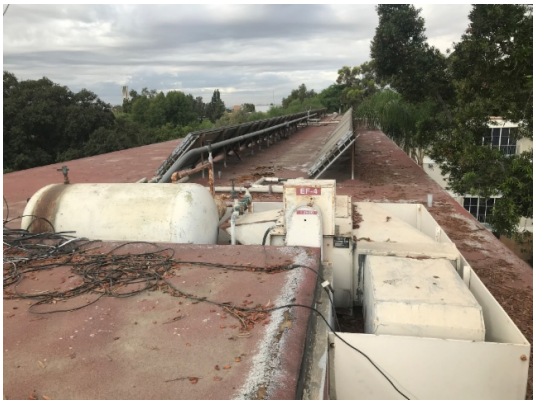

Photo 4

Overview.

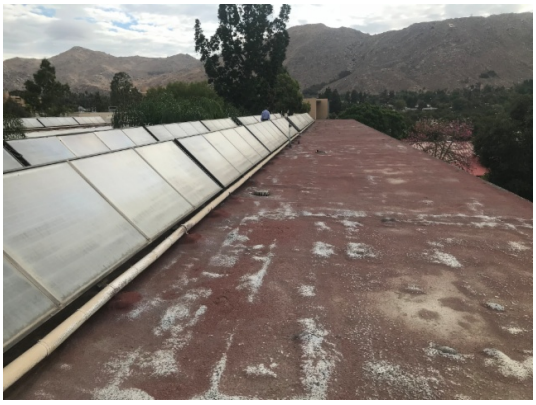

Photo 5

Overview.

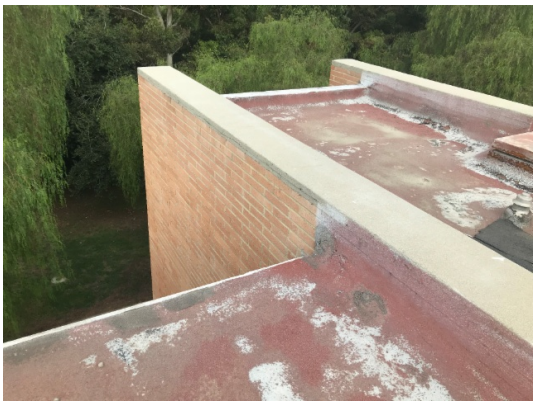

Photo 6

Perimeter wall to metal edge detail.

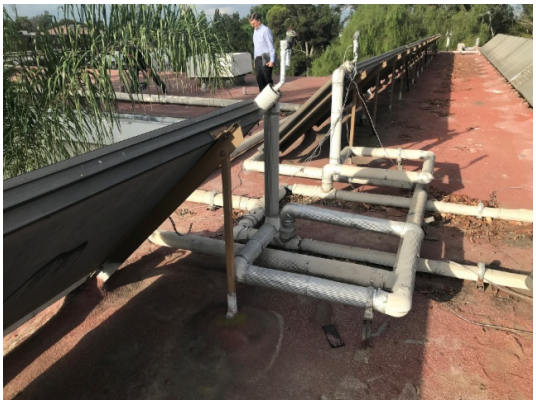

Photo 7

Heavy conduit section from solar panels.

Photo 8

Overview.

Photo 9

Overview.

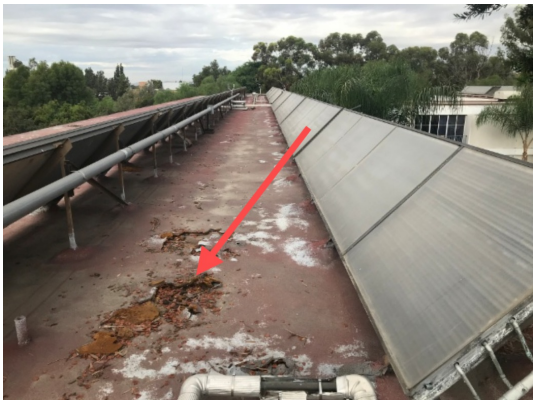

Photo 10

Severe damage to foam membrane.

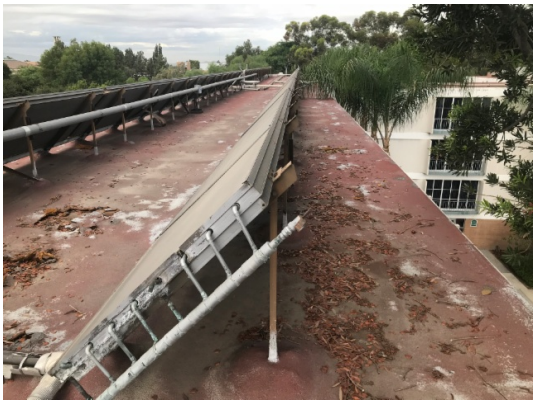

Photo 11

Overview.

Photo 12

Mechanical equipment near elevator shaft.

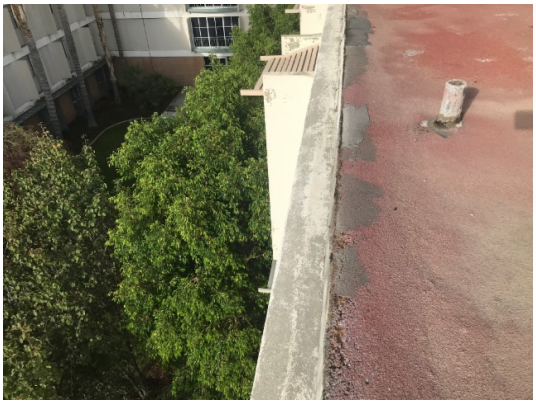

Photo 13

Metal edge to concrete perimeter detail.

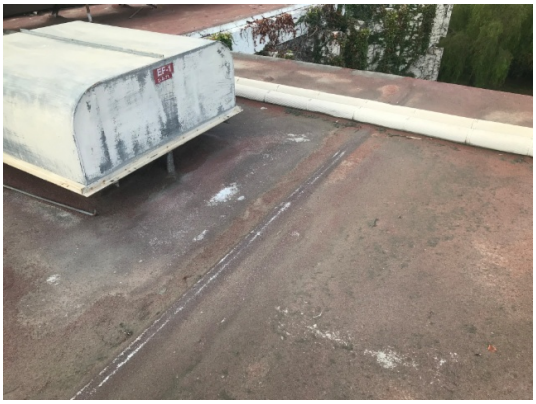

Photo 14

The expansion joint was buried beneath the foam membrane.

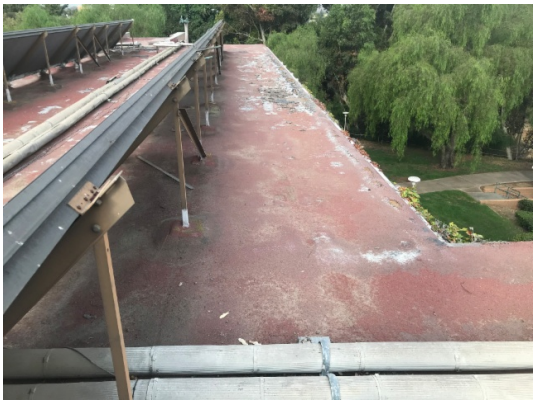

Photo 15

Overview.

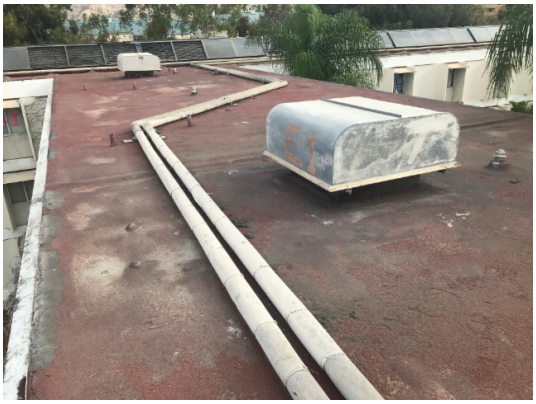

Photo 16

Overview.

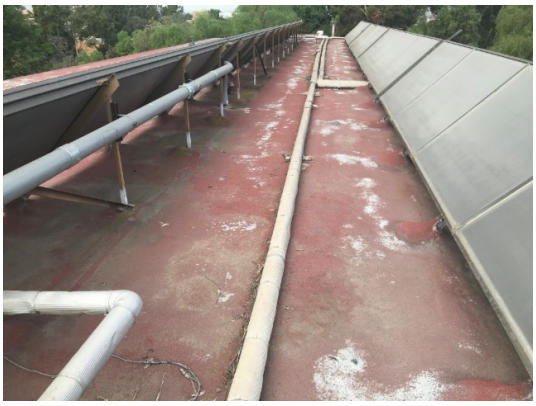

Photo 17

Overview.

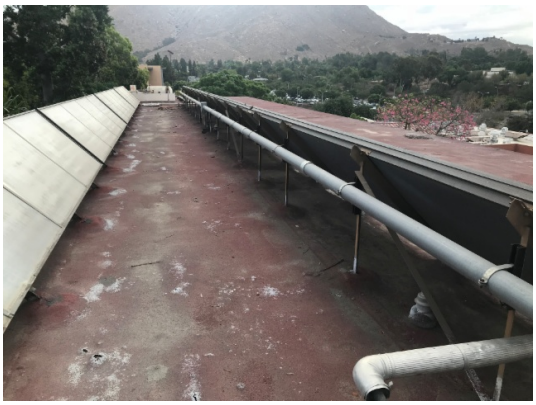

Photo 18

Overview.

Photo 19

Overview.

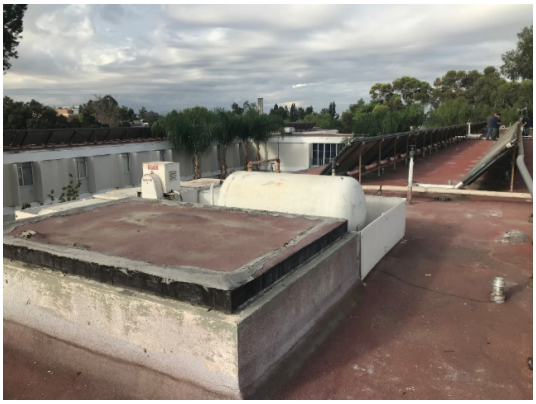

Photo 20

Elevator shaft.

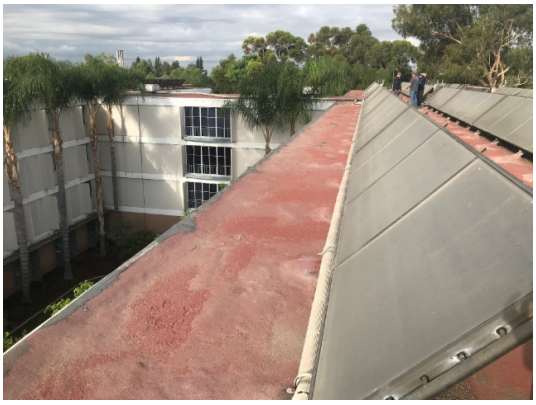

Photo 21

Overview.

Solution Options

Client: UC Riverside

Facility: Lothian Hall

Roof Section: West Lothian Hall

Replace Options

Solution Option:	Replace	**Action Year:**	2018
Square Footage:	18,000	**Expected Life (Years):**	35
Budget:	-		

The replacement option example is for the entire roof section of UC Riversides West Lothian Hall . The roof is approximately 18,000 square feet. At over 25+ years of age, this roof is in need of replacement. The following scope is based on similar work performed on public works projects with like conditions. The scope can be changed or modified to meet the specific needs of the owner or designer and is only intended to be an example.

1. Remove existing roof system down to decking and dispose of properly including pitch pockets and metal edge.

2. Inspect substrate for any deficiencies and repair as needed

3. Install fully adhered tapered insulation system and gypsum board per wind up lift calculations.

4. Install (2) plies of Type IV felt over gypsum board in hot asphalt.

5. Apply modified flashing ply at all angles and flashings in hot asphalt.

6. Install Stressply Plus FR Mineral surface cap sheet over felts in hot asphalt.

7. After roof has cured for at least 20 days install Pyramic 3.0 gallons per square.

8. Install flood coat at 2.0 gallons per square with polyurea in designated ponding areas in and around water channels/drains.

9. Install new Zinc split jacks at all pipe penetrations.

10. Use Tuff Flash liquid flashing system at all penetrations.

- Provide 2-year contractor warranty
- Provide 30-year watertight manufacturer warranty