Final selection and approval of the roofing system for new construction and reroofing is reserved by the University Architect’s Office. Schedule a preliminary meeting with the IU Roofing and Construction Project Manager to review the scope of roofing work.

- Provide a set of 75% and 100% Construction Documents in .pdf format to the IU Roofing and Construction Project Manager for review.
- For reroofing projects, schedule a meeting on site to review existing conditions with the IU Roofing and Construction Project Manager.
- Only single-ply membrane systems are shown; special construction and “green roofs” may require a different roofing system.
- Note that all of the requirements for new construction will apply for reroofing projects.

A. Follow these guidelines for design development cost estimates:

1. Comply with Factory Mutual requirements for hail resistance “SH”.

2. Provide exterior fire-test exposure “Class A” for all roofing materials.

3. Prepare a wind uplift analysis for the roof system in accordance with Indiana Building Code requirements. This can be done with an online calculator available from: www.roofnav/fmglobal.com or www.roofwinddesigner.com.

4. Provide No Dollar Limit (NDL) warranties from the manufacturer. Specify roofing membrane manufacturer’s approved insulation, cover boards, flashings, adhesives, accessories, etc. to comply with warranty requirements.

5. Provide sumps at all roof drains, minimum size of 48” x 48”. Provide overflow drains or scuppers. Locate roof drains at center of spans, not at column heads.

6. Provide roof hatches, ladders, or operable windows to access all roof levels or areas.

7. Provide pre-cast concrete pavers with slip sheets at access hatches, doorways, ladders and walkways to roof-top equipment.
8. Provide fall protection at all roof levels.


10. Design for minimum 8-inch clearance from the finished surface of roof to bottom of flashing at all vertical surfaces. Allow a minimum of 24-inches below cooling towers, horizontal ducts, and similar equipment that is elevated above the roof surface. Take into account the thickness of tapered insulation.

11. When necessary for access to service roof top equipment, design elevated work platforms, walkways and cross-over ladders with OSHA – approved railings.

12. Specify roofing inspections by the roofing manufacturer’s representative with the IU Roofing and Construction Project Manager present and copies of the inspection reports provided to the Project Team.

B. Major Capital Projects - Select 30-year, No Dollar Limit, full systems warranty, fully adhered, to include these approved manufacturers:

1. EPDM (90 mil): Carlisle Syntec, Firestone, Johns-Manville,

2. TPO (80 mil, fleece backed): Carlisle Syntec, Firestone, GAF, Johns-Manville

C. Minor Capital Projects (when approved by UAO) – Select fully adhered, No Dollar Limit, 20-year warranty roofing systems to include any of the following:

1. EPDM (60 mil): Carlisle Syntec, Firestone, Johns-Manville

2. TPO (60 mil, fleece backed): Carlisle Syntec, Firestone, GAF, Johns-Manville

3. PVC (60 mil, fleece backed): Carlisle Syntec, Fibertite, GAF, Johns-Manville, Sarnafil,

D. General Requirements:

1. Provide Polyisocyanurate Board Insulation in sufficient layers to provide an average R-33 (aged) insulation in compliance with ASTM C1289-13e1.
a. Insulation shall not exceed 2 inch thickness and 48” x 48” in size with edges and ends staggered a minimum of 6” in each direction. Stagger layers 6 inches in each direction so that joints do not line up vertically.

b. On concrete decks, glue insulation directly to deck. On metal decks, the first layer of insulation shall be mechanically fastened.

1. Provide for field testing to verify that the fasteners comply with FM Global pull-out requirements.

2. Fully adhere subsequent layers of insulation to first layer.

c. Provide minimum 1/4” per foot tapered insulation with saddles and crickets unless roof deck has structural slope.

2. For all warranties and hail stone resistance, a layer of Cover Board, acceptable to roofing membrane manufacturer, is required between the top surface of the insulation and beneath the roofing membrane.

a. Provide Cover Board products made of fiberglass mat-faced, gypsum roof board equal to Georgia-Pacific's “Dens-Deck Prime” or USG “Securock”.

b. Specify Cover Board sized 48” x 48” x ¼” minimum thickness.

c. Install Cover Board with joints staggered as for insulation layers and attached with adhesive.

3. Specify two part, low rise urethane foam adhesive compatible with roof systems, or water-based adhesives for fully adhered roof systems.

a. Note that water-based adhesives are not the same as “low-VOC” adhesives. Low-VOC adhesives that are flammable are not acceptable.

b. Tall parapet wall flashing may require intermediate termination bars.

c. Schedule reroofing activities for late spring, summer and early fall to allow the use of water-based adhesives.

4. When a vapor barrier is required, provide Class 1 (< 0.1perm) SBS modified bitumen, self-stick and self-healing underlayment.
5. Follow the recommendations of SMACNA for detailing sheet metal flashing, coping and locating expansion joints. Depending upon the project, one of the following materials will be recommended by the UAO:

   a. Stainless steel, type 304, dead soft, fully annealed, 2B mill finish
   
   b. Kynar 500 (AAMA 2605) pre-painted steel or aluminum, minimum 0.032”
   
   c. 16 oz. copper. Specify lead-coated copper when exposed to view on exterior or when used with stone veneer buildings.
   
   d. Comply with Indiana Building Code for wind load design and testing of edge securement in accordance with Chapter 16 and ANSI/SPRI ES-1.
   
   e. Only mechanical screw-type fasteners (Tap-Con) shall be used for securing metals to wood or masonry (no nails or drive-in pins).
   
   f. Indicate that membrane flashings shall be the same thickness as the field membrane.

6. Preferred access to all main roof areas is by interior stairs. Exterior stairs, ladders and roof hatches with interior ladders may be used to access minor roof areas. Provide roof hatches with safety posts for climbing onto the roof surface and railings when located near roof edges.

7. Pre-fabricated aluminum ladders are required for access to penthouses, stair towers and other roof levels above or below the main roof level. If ladders exceed 20 feet, provide safety sliding attachment for fall protection harnesses in lieu of cages. Ladders are available from the following suggested vendors:

   a. O'Keeffes [www.okeeffes.com](http://www.okeeffes.com)
   
   b. Alco-Lite Industrial Products [www.alcolite.com](http://www.alcolite.com)
   
   c. Schmidt Structural Products [www.schmidtstructural.com](http://www.schmidtstructural.com)
   

8. Provide precast concrete roof pavers at access doors, hatches, roof ladders and other locations where periodic maintenance of roof-top equipment is
anticipated. Install concrete pavers over a slip sheet that is laid on top of the roof membrane. Provide walk way paver layout on drawings.

a. Size: 24”x24”, color as selected from manufacturer’s standards.

b. Acceptable Manufacturers:
   1. Hanover Architectural Products
   2. Rapid Building systems
   3. Roofblock, Ltd.
   4. Sunny Brook Pressed Concrete Co.
   5. Wausau Tile, Inc. Terra-Paving Div.
   6. Westile Roofing Products

E. Fall Protection: The minimum height of parapet walls at roofs shall be 3’-6” unless fall protection is provided. Comply with OSHA 29CFR 1926.502(d) and ANSI/ASSE Z359.6 for fall protection.

1. Suggested vendors for fall protection who can provide products, engineering, installation, testing and certification:
   a. Peak Fall Protection, Inc. (866-387-9965) www.peak-pf.com
   b. Roottop Anchor, Inc. (800-466-6385) www.rooftopanchor.com
   c. Guardian Fall Protection (800-466-6385) www.guardianfall.com

2. Installation shall be designed by a professional engineer licensed in the State of Indiana and be tested before substantial completion.

3. Design cable lifeline systems so that worker does not have to unhook from fall protection when working on roof.

F. Provide Lightning Protection for all new Capital Projects and coordinate the design with the roofing documents.

G. Reroofing Projects

1. Provide for total tear off of existing roof systems and insulation down to structural deck. Include removal of light weight concrete systems.
a. Check with IU Roofing and Construction Project Manager for building records to determine if ACM may be encountered.

b. Provide for core samples and testing of existing roof flashings and membrane for presence of asbestos containing materials (ACM).

c. Include the core sample results (type of insulation, thickness, type of membrane) and the ACM results in the specifications.

d. If samples are positive for ACM, then some minor changes to the General Conditions concerning the handling of ACM is required.

2. Roof replacement projects typically include more than just replacing the roof system. Use the following check list for existing conditions and advise the UAO team leader of findings:

   o Deteriorated, rusty or abandoned roof top equipment or curbs
   o Damage to adjacent windows, vents, louvers, etc.
   o Missing or damaged lightning protection cables and rods
   o Low curb heights at roof top equipment, roof access doors and access under mechanical equipment/ducts
   o Low plumbing vent and stack heights
   o Low parapet wall height
   o Guy wires, cable penetrations, antennas, cooling tower supports
   o Tree limbs touching the building, overhanging the roof surface, mold or vegetation growing from roof surface
   o Roof expansion joint details at walls and in the field of the roof
   o Missing fasteners at exhaust fans and mechanical equipment
   o Damaged roof drains and strainers, lack of overflow protection, damaged insulation on interior drain piping, and suspect asbestos containing insulation.
o  Deteriorated or leaking skylights

o  Open or deteriorated mortar joints/sealants at walls and coping

o  Delaminating or no waterproof coatings over concrete or masonry

o  No fall protection, guards at roof hatches and access ladders

o  Damaged or rusty access doors and roof hatches

3. Include in unit prices for all reroofing projects the cost of retrofitting damaged roof drains with a replacement roof drain insert as manufactured by OMG “Hercules” Retrodrain with “High Aluminum Strainer Dome” (www.olyfast.com).

4. Include replacement of existing coping stone flashing and parapet wall counter flashing if any of these conditions occur:

   a. Existing flashings are not completely “through wall” with at least ½” of metal exposed on the exterior face of the parapet wall.

   b. Counter flashing is cut off, damaged, or deteriorated.

   c. Adding insulation will raise finished roof surface above the level of flashing.

5. Replace existing metal copings, gutters and downspouts with new materials.

   a. IU will retain salvage rights for all copper removed from roof.