Update Predesign Study for Roof Replacement Activities Building (Areas A and B) and Activities Addition (Area C)
November 22, 2019

Mr. Paul DeMuth
Physical Plant Director
Inver Hills Community College
2500 80th Street East
Inver Grove Heights, MN 55076

RE: Update Predesign Study for Roof Replacement
Activities Building (Areas A and B)
and Activities Addition (Area C)
Inver Hills Community College
Inver Grove Heights, Minnesota
Inspec Project Number: 214896

Dear Mr. DeMuth,

This Update Predesign Study is for the roof replacement and window rehabilitation on the above-mentioned areas at Inver Hills Community College. The following Study complies with the applicable criteria from Minnesota State for reporting on HEAPR projects.

The scope of work for the roof replacement of Activities Building (Areas A and B) and Activities Addition (Area C) is to replace the existing roof systems with a Minnesota State 40-year roof system and reconfigure the roof drainage as required to meet current Minnesota State standards.

Prior to this Study, an Update Predesign Study was performed in 2011. A copy of the report dated May 26, 2011, which is referred to in this Study, is included in the Appendix. A Full Facility Roof Report of the entire campus was performed by Roof Spec in 2018. A copy of the Campus Map dated December 20, 2018, and the Full Facility Roof Report performed September 11, 2017, which were all referred to in this Study are also included in the Appendix.

Sincerely,

INSPEC

Gary C. Patrick, AIA, RRC
Executive Vice President

CJL/GP/bap

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed architect under the laws of the State of Minnesota.

Signature: [Signature]

Typed or Printed Name: Gary C. Patrick

Date: 11/22/19  Registration No.: 22295
Project

Update Predesign Study for Roof Replacement
Activities Building (Areas A and B)
and Activities Addition (Area C)
Inver Hills Community College
Inver Grove Heights, Minnesota

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Campus Map, dated December 20, 2018
Full Facility Roof Report, performed September 11, 2017
Update Predesign Report, dated May 26, 2011
Section 1: Predesign Summary Statement

Project

Update Predesign Study for Roof Replacement
Activities Building (Areas A and B)
and Activities Addition (Area C)
Inver Hills Community College
Inver Grove Heights, Minnesota

Background

This Predesign Study is based upon an Update Predesign Report dated May 26, 2011, the Campus Map
dated December 20, 2018, and the Full Facility Roof Report performed September 17, 2017, which were
all reviewed to perform this Study.

This Update Predesign Report revisits and updates the previously evaluated roof areas on Activities
Building (Areas A and B) and Activities Addition (Area C) that were categorized to be reroofed within the
next 0 - 5 years. It is our understanding that the above-mentioned roof areas at Inver Hills Community
College have reached their life expectancy and are a high priority to be reroofed due to their present
condition and previous roof deficiencies.

Scope of Work

The scope of work for Inver Hills Community College will consist of the tear-off and complete roof
replacement of the existing roof system down to the existing deck to meet current Minnesota State
standards.

Activities Building (Areas A and B) and Activities Addition (Area C)

The scope of work will include: (Refer to the Campus Plan for the area of work.)

- Remove the existing wood shake roof and sheet metal flashings at Areas A and B, and existing pre-
  engineered metal standing roof and sheet metal flashings at Area C to install a new 40+ year roof
  system to meet Minnesota State standards. The Owner would like to install a new Ludowici
  Ludoshake tile roof system if the structure can support the roof system.
- A Ludowici Ludoshake tile roof system will provide the best long-term performance and will also
  meet 40-year Minnesota State standards. If the existing structure cannot support the Ludowici
  Ludoshake tile roof system, another roof system with less weight such as a pre-engineered metal
  standing seam roof could be considered which will meet 30 years.
- Calculate the roof drainage and reconfigure the roof drainage as necessary to meet current code
  requirements and Minnesota State standards. New built-in gutters, snow retention system, and
  downspouts will be added as necessary.
- **Remove window dormer on the northwest side of the building.** The other dormers (window and
  ventilation) on the facility will have to remain. Infill the obsolete dormer location with new structure
  and decking in order to accommodate the new insulation and base flashing heights required to meet
  current Minnesota State standards.
Section 1: Predesign Summary Statement continued

- Install new LED lighting in the interior of the building in the locations of the obsolete dormer to provide the necessary foot candles of light to meet current code and to provide a comfortable space for the personnel using the facility.
- **Remove existing vented wood soffits and install new LED lighting at existing lights** in the soffits when installing new metal ventilated soffit panels.

**Purpose**

Replacement of the existing roofs at these areas will prevent further deterioration of the building envelope and prevent moisture leakage into the building that damages interior furnishings, interior finishes, and may contribute to poor indoor air quality.
Section 2: Project Description

Project

Update Predesign Study for Roof Replacement
Activities Building (Areas A and B)
and Activities Addition (Area C)
Inver Hills Community College
Inver Grove Heights, Minnesota

Project Description and Rationale

Roof System Evaluation and Energy Statement

The performance characteristics and suitability of several roof systems were examined for this project. The built-up roof system offers the best long-term performance and meets the roofing standards set by Minnesota State Colleges and Universities. A built-up roof system would provide more durability for foot traffic. The life expectancy of the built-up roof system is 40 years. Areas A, B, and C roof slope is 4\" - 5\"/foot. These roof areas are not suitable or recommended for a built-up roof by the roofing industry.

A Ludowici Ludoshake tile roof system will provide the best long-term performance and will also meet 40-year Minnesota State standards. If the existing structure cannot support the Ludowici Ludoshake tile roof system, another roof system with less weight such as a pre-engineered metal standing seam roof could be considered which will meet 30 years.

The insulation thickness and the R-value will be increased by approximately 30%, which will meet Minnesota State standards and current code requirements. The increased R-value of the new insulation system will contribute to the enhancement of the energy performance of the building, thus reducing the impact on the environment and the carbon footprint of the Campus. The R-value of the roof insulation is only a portion of the overall R-value of the entire building envelope; therefore, the amount of energy savings that will be realized is only one component of the overall energy efficiency of the building.

Existing Roof System

At Activities Building (Areas A and B), the roof consists of one layer of six-mil poly vapor retarder over the tongue and groove laminated wood deck, 3-1/4\" nail base insulation (1/2\" OSB board over 2.75\" isocyanurate insulation), a 1.5\" ventilation air space with 2 x 2 wood nailers, 3/4\" plywood, one-ply self-adhering underlayment, two layers of roofing felt, followed by a cedar shake roof system. This existing roof insulation has an approximate R-value of 16.

At Activities Addition (Area C), the roof consists of steel deck, one layer of 1/2\" thermal barrier, one-ply self-adhering vapor retarder, 5.5\" of isocyanurate insulation in multiple layers, one layer of 3/4\" plywood, one-ply of self-adhering underlayment, and a pre-engineered metal standing seam roof system. This existing roof insulation has an approximate R-value of 31.
Section 2: Project Description continued

The transition area between the original building (Areas A and B) and the addition (Area C) consists of the same insulation system as Area C but has a 90-mil EPDM roof membrane over the 3/4" plywood in lieu of the self-adhering underlayment and the pre-engineered metal standing seam roof. This existing roof insulation has an approximate R-value of 31.

New Roof System

A structural analysis was completed on the original Activities Building (Areas A and B) and the Addition (Area C) and the following are the recommendations:

The original Activities Building currently has a cedar shake roof with 3" x 6" tongue and groove wood roof decking supported by glulam beams and large glulam arches. The wood decking controls the capacity of the roof system. The existing roof profile has many valleys and dormers that catch snow, and the deflection of the wood roof deck is too large in these areas. It is recommended to use a metal roofing system to reduce the existing dead loads.

The 2016 Addition to the Activities Building has a sloped, standing seam roof supported by steel joists. These joists do have some additional capacity, but not enough for the Ludowici Ludoshake system. It is recommended that this Addition use a metal roof system.

The existing roof system on the Activities Building (Areas A and B) will be completely removed down to the tongue and groove wood deck. The existing wood deck will be inspected and any wet, damaged, or deteriorated deck will be replaced. The deteriorated decking will be removed and any unforeseen openings in the deck replaced with new deck to match the existing; therefore, salvaging the insulation is not an option.

The new roof system on the Activities Building (Areas A and B) will consist of one-ply of self-adhering vapor retarder adhered to the wood deck, one layer of 2" isocyanurate insulation, one layer of 1.5" isocyanurate insulation with wood nailers at 48" on-center, a layer of 2" isocyanurate insulation, one layer of 3/4" plywood, and one-ply of self-adhering underlayment, followed by a pre-engineered metal roof system. This system would have an average R-value of approximately 31.

The Activities Addition (Area C) roof system below the existing sheet metal standing roof and the 90-mil EPDM membrane at the transition will remain. The existing sheet metal standing seam roof and 90-mil EPDM membrane will be removed down to the plywood and a new one-ply self-adhering underlayment, followed by a new pre-engineered metal roof system installed to match the new pre-engineered metal roof system on Area C. This system would have an average R-value of approximately 31.

Activities Building (Area A and B) and Activities Addition (Area C)

1. The existing wood deck at Areas A and B and steel deck at Area C have a 4" - 5" per foot structural slope.
   - A fully-tapered insulation system will be not required to provide positive drainage.
Section 2: Project Description continued

2. The existing roofing system at roof Areas A and B will be removed down to the existing deck, and the existing metal standing seam roof and 90-mil EDPM roof membrane will be removed to the existing plywood on roof Area C to install a new 40-year Minnesota State roof system. Since the new roof system or systems may weigh more than the existing roof systems, a structural analysis was of all roof areas will be required.
   • This will be done to determine if the existing structure can support the weight of the heavier system. Refer to New Roof Section for structural analysis results.

3. The quantity and size of the existing gutter and downspouts will be evaluated based on the maximum projected roof area.
   • This determines if a larger size will need to be added to meet current code requirements.

4. The existing window dormers on the northwest and northeast sides will be removed, and new structure and wood decking will be installed as needed. The two dormers with the air intake louveres and the large window dormer will remain. New LED lighting will be installed in the areas where the window dormers are removed in order to accommodate the required foot candles to meet current industry standard. The existing smoke detectors, junction boxes, and sprinkler lines will be relocated or capped as necessary in conjuncture to this work.
   • Elimination of the dormers will help improve air/watertight conditions to improve the building envelope.
   • The new LED lighting will reduce the energy usage in the building and provide a more sustainable life cycle.

5. New LED lighting will replace the existing lighting in the soffits when the existing ventilated wood soffits are replaced with a new metal ventilated soffit system.
   • Installing new LED lighting for the old existing lighting on the exterior of the building will reduce the energy usage for the building.

6. There is electrical and telecommunications wiring located at the perimeter of the roof which will be removed and reinstalled at the time of the roof replacement.
   • This will be done to improve the installation of the roofing system. This work will require the services of an electrical consultant.

7. The large air intake louver located adjacent to Area C is deteriorated and has low flashing heights. The louver will need to be raised in order to achieve the required Minnesota State base flashing heights.
   • At this time, the louver will remain with a low flashing height. The existing louver will be removed completely in the future, and a new air intake louver installed. This will be done to meet the Minnesota State base flashing requirements and provide weathertight flashings and underlayment to prevent moisture from entering the building and damaging the interior structure. This work will require the services of mechanical and structural consultants.

8. The existing roof penetrations will be raised and relocated as needed.
   • This will accommodate the necessary flashing height for the new insulation thickness and future reroofing.
   • All associated mechanical/electrical/gas modifications will be incorporated.
   • Relocating mechanical units will provide a symmetrical and unobstructed drainage layout.
Section 2: Project Description continued

9. All obsolete capped curbs, vent stacks, and pipe penetrations will be removed, and deck replacement provided where necessary.
   • Removing obsolete equipment will eliminate unnecessary roof penetrations and equipment lines within the building to allow for future improvements.

10. Cavity-wall construction is present at the adjacent masonry walls, although double through-wall flashing appears to be present or is located too low to accommodate the new roof system. Therefore, new double through-wall flashing will be installed at the time of reroofing.
   • This will provide the necessary base flashing height required to accommodate the new insulation heights. This moves the masonry wall water management system (through-wall flashings) to the correct location for the new roof and prevents moisture from entering the building below through deteriorated and low flashing heights.
   • A new reglet will be provided at the height necessary to accommodate the necessary base flashing height on the solid concrete walls.

Further Detail and Evaluation

Refer to the Appendix for the Update Predesign Report for previous detail information of the above-mentioned roof areas.
Section 3: Expenditures

Project

Update Predesign Study for Roof Replacement
Activities Building (Areas A and B)
and Activities Addition (Area C)
Inver Hills Community College
Inver Grove Heights, Minnesota

Opinion of Probable Construction Cost

Below is an updated opinion of probable construction cost for the above-mentioned roof areas. These roof areas have reached their life expectancy and are a reroofing priority for Inver Hills Community College for 2020/2021 HEAPR funding. Below is an updated opinion of probable construction cost for the 2020/2021 construction season. Add 3% per year for construction beyond 2021.

Activities Building (Areas A and B) and Activities Addition (Area C)

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area A – 209 squares @ $6,000/square</td>
<td>$1,254,000</td>
</tr>
<tr>
<td>Area B – 10 squares @ $3,000/square</td>
<td>$30,000</td>
</tr>
<tr>
<td>Area C – 42 squares @ $4,000/square</td>
<td>$168,000</td>
</tr>
<tr>
<td>Masonry Through Wall flashings</td>
<td>$70,000</td>
</tr>
<tr>
<td>Sheet Metal Wall Panels</td>
<td>$35,000</td>
</tr>
<tr>
<td>Sheet Metal Soffits</td>
<td>$86,000</td>
</tr>
<tr>
<td>Dormer Demolition</td>
<td>$20,000</td>
</tr>
<tr>
<td>Mechanical/Electrical Work</td>
<td>$60,000</td>
</tr>
<tr>
<td>Structural</td>
<td>$50,000</td>
</tr>
<tr>
<td>Construction Cost Subtotal</td>
<td>$1,773,000</td>
</tr>
<tr>
<td>10% Contingency</td>
<td>$177,000</td>
</tr>
<tr>
<td>Construction Cost Total</td>
<td>$1,950,000</td>
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</table>

Design and Construction Administration/Observation Cost

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Bidding Fees</td>
<td>$124,000</td>
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<tr>
<td>Construction Administration/Observation Fees*</td>
<td>$105,000</td>
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<tr>
<td>Subtotal</td>
<td>$229,000</td>
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<tr>
<td>10% Contingency</td>
<td>$23,000</td>
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<tr>
<td>Total including Design, CA/CO, and Contingency</td>
<td>$252,000</td>
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</table>

Minnesota State Project Management Fees

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
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<tbody>
<tr>
<td>State Plan Review Fees</td>
<td>$6,000</td>
</tr>
<tr>
<td>Masonry Mortar Testing Fees</td>
<td>$7,000</td>
</tr>
<tr>
<td>Asbestos Testing, Abatement and Monitoring</td>
<td>$25,000</td>
</tr>
<tr>
<td>Total Plan Review Fees</td>
<td>$38,000</td>
</tr>
</tbody>
</table>

*The construction observation at Areas A and B will consist of fifteen (15) weeks of full-time roof observation, two (2) weeks masonry through-wall observation, and two (2) weeks of combined periodic site visits for observation sheet metal wall panel, mechanical, electrical, and structural work, which overlaps the roofing schedule. Services include submittal review, a preconstruction meeting, full-time construction observation, associated testing services, pay application processing, a final walkover, and project closeout.
Section 4: Schedule Information

Project

Update Predesign Study for Roof Replacement
Activities Building (Areas A and B)
and Activities Addition (Area C)
Inver Hills Community College
Inver Grove Heights, Minnesota

Project Schedule

The project schedule is based on design occurring in the fall of 2020, bidding, contracts, and submittals occurring in the winter/spring of 2020, and construction occurring in the summer of 2021.

If the campus needs construction to start immediately upon receipt of the 2020 HEAPR funding, then field verification and design would need to be expedited by the campus at their own expense and completed prior to the receipt of HEAPR funding. The anticipated design fees are incorporated into these reports so that the campus can be reimbursed for the design fees once funding has been approved.

Activities Building (Areas A and B) and Activities Addition (Area C)

<table>
<thead>
<tr>
<th>Task</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exterior Fieldwork to Verify Conditions</td>
<td>August 31 – September 25, 2020</td>
</tr>
<tr>
<td>Schematic Design Documents</td>
<td>September 28 – October 23, 2020</td>
</tr>
<tr>
<td>Design Development/Construction Documents</td>
<td>October 26 – November 27, 2020</td>
</tr>
<tr>
<td>Final Review and Corrections</td>
<td>November 30 – December 31, 2020</td>
</tr>
<tr>
<td>Bid Process</td>
<td>January 4 – January 29, 2021</td>
</tr>
<tr>
<td>Contracts and Submittals</td>
<td>February 1 – February 26, 2021</td>
</tr>
<tr>
<td>Submittals Material Procurement</td>
<td>March 1 – May 7, 2021</td>
</tr>
<tr>
<td>Construction Window</td>
<td>May 17 – July 30, 2021</td>
</tr>
</tbody>
</table>
Section 5: Appendix
Facility: Activities Building

Date of Last Inspection: Sep 11, 2017
Type of building: Academic

<table>
<thead>
<tr>
<th>Section ID</th>
<th>Budget Year</th>
<th>Activity Type</th>
<th>Action Item?</th>
<th>Allocation</th>
<th>Urgency</th>
<th>Budget Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2018</td>
<td>Repair</td>
<td>No</td>
<td>Expense</td>
<td>Low</td>
<td>$4,000</td>
</tr>
<tr>
<td>A</td>
<td>2019</td>
<td>Replacement</td>
<td>No</td>
<td>Capital</td>
<td>Low</td>
<td>$1,371,001</td>
</tr>
</tbody>
</table>

Replace missing shakes and repair exposed fasteners.

Budget estimate of $1,371,000 is based on replacement of Sections A and B at the same time.

The budget is based on the 2011 predesign report. Recommend updating the predesign report.

B          | 2015        | Replacement   | No           | Capital    | High    | $1            |

Budget estimate of $1,371,000.00 is based on replacement of Sections A and B at the same time. Emergency repairs should be performed as needed to maintain a watertight condition until replacement takes place.

$1,375,002
<table>
<thead>
<tr>
<th>Section ID</th>
<th>Budget Year</th>
<th>Activity Type</th>
<th>Action Item?</th>
<th>Allocation</th>
<th>Urgency</th>
<th>Budget Amount</th>
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</thead>
<tbody>
<tr>
<td>A</td>
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<td>Expense</td>
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<td>$4,000</td>
</tr>
<tr>
<td>A</td>
<td>2019</td>
<td>Replacement</td>
<td>No</td>
<td>Capital</td>
<td>Low</td>
<td>$1,371,001</td>
</tr>
<tr>
<td>B</td>
<td>2015</td>
<td>Replacement</td>
<td>No</td>
<td>Capital</td>
<td>High</td>
<td>$1</td>
</tr>
</tbody>
</table>

$1,375,002
Roof Name: E26157C0469
Roof Size: 20,900 sq. ft.
Est. replacement Cost: $1,290,993.00
Existing System Type: Wood Shingles and Shakes
Year Installed: 1990
Assessed Service Life Remaining (Years): 0
Height: 0 Ft.
Slope: 4 in 12

Interior Sensitivity:

Drainage: Adequate
Currently Leaking?: Unknown
History of Leaking?: Unknown

Drainage and Leak Details: The estimated replacement cost is based on the 2011 predesign report. Recommend updating the predesign report.
## Membrane Defects - Outstanding

<table>
<thead>
<tr>
<th>Defect Type</th>
<th>Severity</th>
<th>Quantity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defect #01</td>
<td>Repair</td>
<td>50</td>
<td>Ea.</td>
</tr>
</tbody>
</table>

**ID #1**  
OBSERVED: 10/28/2013, 8/12/2015, 8/25/2016, 9/11/2017

Deteriorated/damaged/displaced wood shakes

REPAIR: Replace wood shakes.

**COMMENTS:**

---

<table>
<thead>
<tr>
<th>Defect Type</th>
<th>Severity</th>
<th>Quantity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defect #02</td>
<td>Repair</td>
<td>20</td>
<td>Ea.</td>
</tr>
</tbody>
</table>

**ID #2**  
OBSERVED: 10/28/2013, 8/20/2015, 8/25/2016, 9/11/2017

Exposed fastener

REPAIR: Re-secure if necessary and reseal fastener.

**COMMENTS:**
# Membrane Defects - Outstanding Continued...

<table>
<thead>
<tr>
<th>Defect Type</th>
<th>Severity</th>
<th>Quantity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defect #03</td>
<td>Monitor</td>
<td>100</td>
<td>Ea.</td>
</tr>
</tbody>
</table>

**ID #3**  OBSERVED: 10/23/2014, 8/20/2015, 8/25/2016, 9/11/2017

Debris/vegetation/foreign materials on roof

**REPAIR:** Monitor for repair prior to replacement.

**COMMENTS:** Large quantities of moss growing on the north facing slopes.

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<table>
<thead>
<tr>
<th>Defect Type</th>
<th>Severity</th>
<th>Quantity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defect #04</td>
<td>Investigate and repair</td>
<td>1</td>
<td>Ea.</td>
</tr>
</tbody>
</table>

**ID #4**  OBSERVED: 10/23/2014, 8/20/2015, 8/25/2016, 9/11/2017

Possible structural deterioration/defect

**REPAIR:** Investigate and repair using appropriate materials and procedures.

**COMMENTS:**
Roof Name: Not Updated

Roof Size: 1,300 sq. ft.

Est. replacement Cost: $91,000.00

Existing System Type: Standing Seam Sheet Metal Roofing

Year Installed: 1975

Assessed Service Life Remaining (Years): 0

Height: 0 Ft.

Slope:

Interior Sensitivity:

Drainage: Inadequate

Currently Leaking? Unknown

History of Leaking? Unknown

Drainage and Leak Details:
PROJECT: Inver Hills Community College  DATE: May 26, 2011
Inver Grove Heights, Minnesota  FILE NO.: 211934

UPDATE PREDESIGN REPORT

GENERAL

This report is a supplement to the 2011 Roof Management Inspection and Reporting. System type, condition of these roofs, and repair items are referenced in that report. The purpose of this report is to update the previously evaluated roof areas categorized to be reroofed within the next 0 to 5 years. This report revisits and updates the design issues and new roofing systems approach, and it projects costs associated with reroofing construction to MnSCU standards for planning purposes.

REROOFING DESIGN ISSUES

Library (Cedar Shakes)
Areas A and B

Note: The College has requested that we list the Science Building as a priority and that it be reroofed before the Library Building, should money only be allotted for one of the two. This is despite the fact that the Library roof is older. Both buildings are slated for reroofing in 2012. Further conversations will be held between the Campus, MnSCU, and our office to make the final decision on which of the two roofs should be replaced if money is only found to reroof one of the buildings.

1. The existing wood deck is structurally sloped at approximately 5" per foot; therefore, a roof system other than the typical MnSCU built-up roof system will be required. Campus personnel have requested that the roof system remain the same in order to match the rest of the buildings on campus. Therefore, a new fire-treated, cedar shake roof system will be installed with all appropriate underlayments.

2. The soffit/ridge ventilation system will be evaluated and calculations made for appropriate sizing to accommodate intake and exhaust requirements. It is anticipated that the continuous soffit and ridge vents will be maintained with upgraded materials. All clogged soffit vents will require cleaning.

3. Prefinished sheet metal wall panels will be used at all dormer end walls and at the fascia system where presently, cedar shakes are in place. Campus personnel have required that the wide fascia band be modified to make it less imposing. They have suggested using a stepped back fascia technique similar to that used on the new Academic and Student Services Building. This will require that additional wood framing be designed and installed to match the profile.

As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients and our written authorization is necessary to publish any statements, conclusions or extracts from or regarding our reports.
4. A structural evaluation will be required to determine if the existing structures can handle any additional weight, if a different type of roof system is selected. This work will require the services of a structural consultant.

5. The dormer windows and ventilation louvers may need to be removed, raised, and reinstalled with new flashing materials to insure a long-term watertight condition. Windows may be replaced at this time. This work will require the services of window and mechanical consultants.

6. The low-to-high roof area walls may need to be covered with plywood, underlayments, and sheet metal flashing to provide a long-term watertight condition and to accommodate the necessary flashing heights.

7. At the entrance locations, a built-in sheet metal gutter exists that allows drainage to freefall onto the existing landscaping. If the built-in gutters are maintained in the current location, new gutter liners will be fabricated out of a natural metal, fully soldered, and connected to new downspouts, which will discharge over concrete splash blocks. Final design solutions will also consider moving the gutter location to the outside edge of the eave.

8. If it is determined that new cedar shake shingles will be used to reroof the Library roof, then sheet metal crickets would be fabricated from a natural metal and fully soldered. The existing fascia, dormers, and end walls will be designed with building materials to match the recent renovation at the College Center.

Activities
Areas A and B

1. The existing wood deck is structurally sloped at approximately 4” per foot; therefore, a roof system other than the typical MnSCU built-up roof system will be required. Campus personnel have requested that the roof system remain the same in order to match the rest of the buildings on campus. Therefore, a new fire-treated, cedar shake roof system will be installed with all appropriate underlayments.

2. The soffit/ridge ventilation system will be evaluated and calculations made for appropriate sizing to accommodate intake and exhaust requirements. It is anticipated that the continuous soffit and ridge vents will be maintained with upgraded materials. All clogged soffit vents will require cleaning.

3. Prefinished sheet metal wall panels will be used at all dormer end walls and at the fascia system where presently, cedar shakes are in place. Campus personnel have required that the wide fascia band be modified to make it less imposing. They have suggested using a stepped back fascia technique similar to that used on the new Academic and Student Services Building. This will require that additional wood framing be designed and installed to match the profile.

4. The dormer windows and ventilation louvers may need to be removed, raised, and reinstalled with new flashing materials to insure a long-term watertight condition. Windows may be
replaced at this time. This work will require the services of MnSCU window and mechanical consultants.

5. Cavity wall construction exists at the brick masonry walls and no through-wall flashing appears to be present; therefore, new through-wall flashing will need to be installed along with new step flashing. This work will require the services of a masonry consultant.

6. At the entrance locations, a built-in sheet metal gutter exists that allows drainage to freefall onto the existing landscaping. If the built-in gutters are maintained in the current location, new gutter liners will be fabricated out of zing-tin coated stainless steel and connected to the new downspouts, which will discharge over concrete splash blocks. Final design solutions will also consider moving the gutter location to the outside edge of the eave.

7. Large structurally sloped crickets will be covered with all appropriate underlayments, followed by a custom fabricated natural sheet metal, with all joints fully soldered together. The existing fascia, dormers, and end walls will be designed with building materials to match the recent renovation at the College Center.

8. The floodlight assembly will need to be removed from the southeast entrance to allow for the new gutter system to be installed along the eave. The support assembly for the floodlights will need to be re-engineered to fit around the newly installed gutters or it may be moved to a different location altogether. This work will require the services of a electrical consultant.

9. The sagging ridge and rafters will need to be evaluated for their structural integrity during the initial design phase of the project. This work will require the services of a structural consultant.

Boiler Room
Areas A and B

1. The existing wood deck is structurally sloped at approximately 5" per foot; therefore, a roof system other than the typical MnSCU built-up roof system will be required. Campus personnel have requested that the roof system remain the same in order to match the rest of the buildings on campus. Therefore, a new fire-treated, cedar shake roof system will be installed with all appropriate underlayments.

2. The soffit/ridge ventilation system will be evaluated and calculations made for appropriate sizing to accommodate intake and exhaust requirements. It is anticipated that the continuous soffit and ridge vents will be maintained with upgraded materials. All clogged soffit vents will require cleaning.

3. Prefinished sheet metal wall panels will be used at all dormer end walls and at the fascia system where presently, cedar shakes are in place. Campus personnel have required that the wide fascia band be modified to make it less imposing. They have suggested using a stepped back fascia technique similar to that used on the new Academic and Student Services Building. This will require that additional wood framing be designed and installed to match the profile.

As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients and our written authorization is necessary to publish any statements, conclusions or extracts from or regarding our reports.
4. The dormer ventilation louvers may need to be removed, raised, and reinstalled with new flashing materials to insure a long-term watertight condition. Louvers also may be replaced at this time. This work will require the services of a mechanical consultant.

5. A new custom fabricated, prefinished metal or copper gutter will be mounted along the eave on the west side of the building. The gutter will be connected to the new, prefinished metal or copper open-faced downspout and positioned over a concrete splash block.

6. Large structurally sloped crickets will be covered with all appropriate underlayments, followed by a custom fabricated, sheet metal covering, with all joints fully soldered together. The existing fascia, dormers, and end walls will be designed with building materials to match the recent renovation at the College Center.

**Business Building**

**Area A**

1. The existing wood deck is structurally sloped at approximately 5" per foot; therefore, a roof system other than the typical MnSCU built-up roof system will be required. Campus personnel have requested that the roof system remain the same in order to match the rest of the buildings on campus. Therefore, a new fire-treated, cedar shake roof system will be installed with all appropriate underlayments.

2. The soffit/ridge ventilation system will be evaluated and calculations made for appropriate sizing to accommodate intake and exhaust requirements. It is anticipated that the continuous soffit and ridge vents will be maintained with upgraded materials. All clogged soffit vents will require cleaning.

3. Prefinished sheet metal panels will be used at all dormer end walls and at the fascia system where presently, cedar shakes are in place. Campus personnel have required that the wide fascia band be modified to make it less imposing. They have suggested using a stepped back fascia technique similar to that used on the new Academic and Student Services Building. This will require that additional wood framing be designed and installed to match the profile.

4. The clerestory window sills may need to be raised to accommodate the base flashing height required to meet current MnSCU standards. The windows may require replacement with new units that will fit the smaller opening. This work will require the services of a MnSCU window consultant.

5. At the entrance locations, a built-in sheet metal gutter exists that allows drainage to freefall onto the existing landscaping. If the built-in gutters are maintained in the current location, new gutter liners will be fabricated out of a natural metal and connected to new downspouts, which will discharge over concrete splash blocks. Final design solutions will also consider moving the gutter location to the outside edge of the eave.

6. Tree branches will need to be trimmed back and away from the roof edge to allow for the reroofing project to proceed unimpeded. This work will be done by campus personnel.
Child Care
Area A

1. The existing wood deck is structurally sloped at approximately 5" per foot; therefore, a roof system other than the typical MnSCU built-up roof system will be required. Campus personnel have requested that the roof system remain the same in order to match the rest of the buildings on campus. Therefore, a new fire-treated, cedar shake roof system will be installed with all appropriate underlayments.

2. The soffit/ridge ventilation system will be evaluated and calculations made for appropriate sizing to accommodate intake and exhaust requirements. It is anticipated that the continuous soffit and ridge vents will be maintained with upgraded materials. All clogged soffit vents will require cleaning.

3. Prefinished sheet metal panels will be used at all dormer end walls and at the fascia system where presently, cedar shakes are in place. Campus personnel have required that the wide fascia band be modified to make it less imposing. They have suggested using a stepped back fascia technique similar to that used on the new Academic and Student Services Building. This will require that additional wood framing be designed and installed to match the profile.

4. At the main entrance location and at all classroom door locations, a built-in sheet metal gutter exists that allows drainage to freefall onto the existing landscaping. If the built-in gutters are maintained in the current location, new gutter liners will be fabricated out of a natural metal and connected to the new downspouts, which will discharge over concrete splash blocks. Final design solutions will also consider moving the gutter location to the outside edge of the eave.

5. Tree branches will need to be trimmed back and away from the roof edge to allow for the reroofing project to proceed unimpeded. This work will be done by campus personnel.

6. Child Care remains open through the school year and throughout the summer; therefore, special care must be exercised at all times during the project to secure doors from falling debris. The contractor will need to provide scaffolding with a plywood covering as protection along the eave of the building at the playground area and at the main entrance.

Liberal Arts
Areas B and C

1. The existing wood deck is structurally sloped at approximately 5" per foot; therefore, a roof system other than the typical MnSCU built-up roof system will be required. Campus personnel have requested that the roof system remain the same in order to match the rest of the buildings on campus. Therefore, a new fire-treated, cedar shake roof system will be installed with all appropriate underlayments.

2. The soffit/ridge ventilation system will be evaluated and calculations made for appropriate sizing to accommodate intake and exhaust requirements. It is anticipated that the continuous...
soffit and ridge vents will be maintained with upgraded materials. All clogged soffit vents will require cleaning.

3. Prefinished sheet metal wall panels will be used at all dormer end walls and at the fascia system where presently, cedar shakes are in place. Campus personnel have required that the wide fascia band be modified to make it less imposing. They have suggested using a stepped back fascia technique similar to that used on the new Academic and Student Services Building. This will require that additional wood framing be designed and installed to match the profile.

4. Cavity wall construction exists at the brick masonry walls and no through-wall flashing appears to be present; therefore, new through-wall flashing will need to be installed, along with new step flashing. This work will require the services of a masonry consultant.

5. At the entrance locations, new gutters will be fabricated from natural metals, fully soldered, and cladded with color-coated sheet metal and installed along the eave. The gutters will be connected to the new, open-face downspouts, which will discharge over the concrete splash blocks.

6. Large structurally sloped crickets will be covered with all appropriate underlayments, followed by a custom fabricated natural sheet metal, with all joints fully soldered together. The existing fascia, dormers, and end walls will be designed with building materials to match the recently renovated College Center.

Science
Areas A and B

Note: The College has requested that we list the Science Building as a priority and that it be reroofed before the Library Building, should money only be allotted for one of the two. This is despite the fact that the Library roof is older. Both buildings are slated for reroofing in 2012. Further conversations will be held between the Campus, MnSCU, and our office to make the final decision on which of the two roofs should be replaced if money is only found to reroof one of the buildings.

1. The existing wood deck is structurally sloped at approximately 5" per foot; therefore, a roof system other than the typical MnSCU built-up roof system will be required. Campus personnel have requested that the roof system remain the same in order to match the rest of the buildings on campus. Therefore, a new fire-treated, cedar shake roof system will be installed with all appropriate underlayments.

2. The soffit/ridge ventilation system will be evaluated and calculations made for appropriate sizing to accommodate intake and exhaust requirements. It is anticipated that the continuous soffit and ridge vents will be maintained with upgraded materials. All clogged soffit vents will require cleaning.

3. Prefinished sheet metal panels will be used at all dormer end walls and at the fascia system where presently, cedar shakes are in place. Campus personnel have required that the wide fascia band be modified to make it less imposing. They have suggested using a stepped back
fascia technique similar to that used on the new Academic and Student Services Building. This will require that additional wood framing be designed and installed to match the profile.

4. The dormer window and louver sills may need to be raised to accommodate the base flashing height required to meet current MnSCU standards. Windows and ventilation louveres may require replacement with new units that will fit the smaller opening. This work will require the services of window and mechanical consultants.

5. At the entrance locations, a built-in sheet metal gutter exists that allows drainage to freefall onto the existing landscaping. If the built-in gutters are maintained in the current location, new gutter liners will be fabricated out of copper and connected to the new copper downspouts and emptying over concrete splash blocks. Final design solutions will also consider moving the gutter location to the outside edge of the eave. This design would allow for conventional prefinished metal to be used for fabrication of the gutter and the downspout, and would eliminate the concern of soffits deteriorating if the gutter liner develops a leak and would allow for easier cleaning of the gutter trough.

6. Large structurally sloped crickets will be covered with all appropriate underlayments, followed by a custom fabricated natural sheet metal, with all joints fully soldered together. The existing fascia, dormers, and end walls will be designed with building materials to match the recently renovated College Center.

7. The communication cable currently attached to the sill of the dormer will be relocated to the exterior wall or to a pier securely mounted to the roof deck and rafter. This work will require the services of a structural consultant.

8. The weather station will be relocated to the outside wall. This work may require the services of a mechanical consultant.

Fine Arts (Cedar Shakes)

Area B

1. The existing wood deck is structurally sloped at approximately 4" per foot; therefore, a roof system other than the typical MnSCU built-up roof system will be required. Campus personnel have requested that the roof system remain the same in order to match the rest of the buildings on campus. Therefore, a new fire-treated, cedar shake roof system will be installed with all appropriate underlayments.

2. The soffit/ridge ventilation system will be evaluated and calculations made for appropriate sizing to accommodate intake and exhaust requirements. It is anticipated that the continuous soffit and ridge vents will be maintained with upgraded materials. All clogged soffit vents will require cleaning.

3. Prefinished sheet metal wall panels will be used at all dormer end walls and at the fascia system where presently, cedar shakes are in place. Campus personnel have required that the wide fascia band be modified to make it less imposing. They have suggested using a stepped back fascia technique similar to that used on the new Academic and Student Services
Building. This will require that additional wood framing be designed and installed to match the profile.

4. A structural evaluation will be required to determine if the existing structures can handle any additional weight, if a different type of roof system is selected. This work will require the services of a structural consultant.

5. Large structurally sloped crickets will be covered with all appropriate underlayments, followed by a custom fabricated natural sheet metal, with all joints fully soldered together. The existing fascia, dormers, and end walls will be designed with building materials to match the recent renovation at the College Center.

6. Solid wall construction exists at the high masonry stage wall; therefore, no through-wall flashing will be required. However, the reglet joints are currently too low and will need to be recut higher on the wall to accommodate the necessary flashing heights as required to meet current MnSCU standards.

7. The obsolete boiler stack will be removed and deck replacement provided at the opening. This work will require the services of a structural consultant.

8. There is currently no access to the high stage roof from the surface of the roof. A rooftop access ladder with a OSHA cage enclosure is recommended. Discussions with campus officials and the architect will take place during the design process to determine the appropriate location for the structure. This work will require the services of a structural consultant.

9. Several expansion joints in the high masonry walls are exhibiting signs of deterioration along the sealant joints. These joints will be raked clean of sealant and the backer rod removed. New backer rod and sealant will be installed. In addition, cracked and broken brick is evident along the upper walls near the recessed mechanical room area. It is recommended that these bricks be repaired or replaced and be included in the scope of work for this project. All this work may require the services of a masonry consultant.

NEW ROOF SYSTEM

The following is a general sense of the reroofing construction. Further development will take place when this roof is approved for design.

The performance characteristics and suitability of several roof systems were examined for this project.

On the Library roof areas, the existing cedar shakes and underlayment will be removed down to the existing wood deck. New insulation, wood nailers, 3/4" plywood substrate underlayments, and wood shakes will be installed, which is considered to be a 30-year roof system.

On Activities Areas A and B, the existing cedar shakes and underlayment will be removed down to the existing wood deck. New insulation, wood nailers, 3/4" plywood substrate, underlayments, and wood shakes will be installed, which is considered to be a 30-year roof system.

As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients and our written authorization is necessary to publish any statements, conclusions or extracts from or regarding our reports.
On the Boiler Room Areas A and B, the existing cedar shakes and underlayment will be removed down to the existing wood deck. New insulation, wood nailers, 3/4" plywood substrate, underlayments, and wood shakes will be installed, which is considered to be a 30-year roof system.

On the Business Building Area A, the existing cedar shakes and underlayment will be removed down to the existing wood deck. New insulation, wood nailers, 3/4" plywood substrate underlayments, and wood shakes will be installed, which is considered to be a 30-year roof system.

On Child Care Area A, the existing cedar shakes and underlayment will be removed down to the existing wood deck. New insulation, wood nailers, 3/4" plywood substrate, underlayments, and wood shakes will be installed, which is considered to be a 30-year roof system.

On Liberal Arts Areas B and C, the existing cedar shakes and underlayment will be removed down to the existing wood deck. New insulation, wood nailers, 3/4" plywood substrate, underlayments, and wood shakes will be installed, which is considered to be a 30-year roof system.

On Science Areas A and B, the existing cedar shakes and underlayment will be removed down to the existing wood deck. New insulation, wood nailers, 3/4" plywood substrate, underlayments, and wood shakes will be installed, which is considered to be a 30-year roof system.

On the Fine Arts Building Area B, the existing cedar shakes and underlayment will be removed down to the existing wood deck. New insulation, wood nailers, 3/4" plywood deck sheathing, underlayments, and fire-retardant treated cedar shakes will be installed, which is considered to be a 30-year roof system.

**OPINION OF PROBABLE CONSTRUCTION COSTS**

The following costs are based on roof systems meeting the requirements of Minnesota State Colleges and Universities. An additional 5% per year inflation factor should be added to the costs when submitted for HEAPR funding beyond 2012.

**Library**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Areas A and B</td>
<td></td>
</tr>
<tr>
<td>200 squares @ $3,500/square</td>
<td>$700,000</td>
</tr>
<tr>
<td>Sheet Metal, Fascia, Gutter, and Crickets</td>
<td>139,000</td>
</tr>
<tr>
<td>Window and Louver Replacement</td>
<td>64,000</td>
</tr>
<tr>
<td>Mechanical/Electrical Work</td>
<td>10,000</td>
</tr>
<tr>
<td>Structural Work</td>
<td>10,000</td>
</tr>
<tr>
<td>10% Contingency</td>
<td>92,000</td>
</tr>
<tr>
<td>Design</td>
<td>90,000</td>
</tr>
<tr>
<td>Construction Observation</td>
<td>131,000</td>
</tr>
<tr>
<td>Total</td>
<td>$1,236,000</td>
</tr>
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</table>

**Activities**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area A</td>
<td></td>
</tr>
<tr>
<td>209 squares @ $3,500/square</td>
<td>$732,000</td>
</tr>
<tr>
<td>Copper Crickets 13 sqs @ $7,000/square</td>
<td>91,000</td>
</tr>
<tr>
<td>Sheet Metal Fascia</td>
<td>103,000</td>
</tr>
<tr>
<td>Masonry Work</td>
<td>28,000</td>
</tr>
<tr>
<td>Window/Louver Replacement</td>
<td>33,000</td>
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<tr>
<th>Inver Hills Community College</th>
<th>Inspecl File No.: 211934</th>
<th>May 26, 2011</th>
<th>Page 10</th>
</tr>
</thead>
</table>

### Mechanical/Electrical Work
- 20,000

### Structural Work
- 20,000

### 10% Contingency
- 103,000

### Design
- 75,000

### Construction Observation
- 166,000

### Total
- $1,371,000

### Boiler Room

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>22 squares @ $4,200/square</td>
<td>$93,000</td>
</tr>
<tr>
<td>B</td>
<td>Copper Cricket &amp; Gutter 3 sq @ $7,000/sq</td>
<td>21,000</td>
</tr>
<tr>
<td></td>
<td>Sheet Metal Fascia</td>
<td>34,000</td>
</tr>
<tr>
<td></td>
<td>Louver Replacement</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>Mechanical/Electrical Work</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>10% Contingency</td>
<td>16,000</td>
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<tr>
<td></td>
<td>Design</td>
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<td></td>
<td>Construction Observation</td>
<td>42,000</td>
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<td></td>
<td><strong>Total</strong></td>
<td><strong>$241,000</strong></td>
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### Business Building

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<tbody>
<tr>
<td>A</td>
<td>185 squares @ $3,500/square</td>
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<tr>
<td></td>
<td>Sheet Metal, Fascia, Gutters</td>
<td>121,000</td>
</tr>
<tr>
<td></td>
<td>Window Replacement</td>
<td>55,000</td>
</tr>
<tr>
<td></td>
<td>10% Contingency</td>
<td>82,000</td>
</tr>
<tr>
<td></td>
<td>Design</td>
<td>56,000</td>
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<td></td>
<td>Construction Observation</td>
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<td></td>
<td><strong>Total</strong></td>
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### Child Care

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<th>Area</th>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>65 squares @ $3,500/square</td>
<td>$228,000</td>
</tr>
<tr>
<td></td>
<td>Sheet Metal, Fascia, Gutters</td>
<td>65,000</td>
</tr>
<tr>
<td></td>
<td>10% Contingency</td>
<td>29,000</td>
</tr>
<tr>
<td></td>
<td>Design</td>
<td>24,000</td>
</tr>
<tr>
<td></td>
<td>Construction Observation</td>
<td>50,000</td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>$396,000</strong></td>
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### Liberal Arts

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
<th>Cost</th>
</tr>
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<tbody>
<tr>
<td>B</td>
<td>123 squares @ $3,500/square</td>
<td>$431,000</td>
</tr>
<tr>
<td></td>
<td>Copper Cricket 1 square @ $7,000/square</td>
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</tr>
<tr>
<td>C</td>
<td>Sheet Metal Fascia</td>
<td>121,000</td>
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<tr>
<td></td>
<td>Masonry</td>
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</tr>
<tr>
<td></td>
<td>10% Contingency</td>
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<tr>
<td></td>
<td>Design</td>
<td>59,000</td>
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<tr>
<td></td>
<td>Construction Observation</td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>$801,000</strong></td>
</tr>
</tbody>
</table>

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### Science
- **Area A**
  - 168 squares @ $3,500/square
  - Copper Cricket & Gutters 7 sq @ $7,000/sq
  - Sheet Metal Fascia
  - Window Work
  - Louvers
  - Structural Work
  - 10% Contingency
  - Design
  - Construction Observation
  - **Total**: $588,000

- **Area B**
  - 105,000
  - 43,000
  - 20,000
  - 5,000
  - 81,000
  - 80,000
  - 129,000
  - **Total**: $1,100,000

### Fine Arts
- **Area B**
  - 129 squares @ $3,500/square
  - Sheet Metal, Fascia, and Crickets
  - Masonry Work
  - Mechanical Work
  - Structural Work
  - 10% Contingency
  - Design
  - Construction Observation
  - **Total**: $452,000

- 43,000
- 7,000
- 25,000
- 25,000
- 55,000
- 77,000
- 124,000
- **Total**: $808,000

### REMARKS
This report is a supplement to our Roof Management Inspection Reporting of the roof system at Inver Hills Community College, Inver Grove Heights, Minnesota. Copies of the field notes and photographs will be retained in our files for future reference. Please feel free to call our office if you have any questions.

### INSPEC

By: [Signature]

JAP/djb

As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients and our written authorization is necessary to publish any statements, conclusions or extracts from or regarding our reports.