

# Alaska State Legislature

## Legislative Affairs Agency

### Office of Information Technology

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**TO:** Representative David Guttenberg, Chair  
Legislative Council

**FROM:** Tim Banaszak, Manager LB  
Information Technology

**DATE:** September 11, 2018

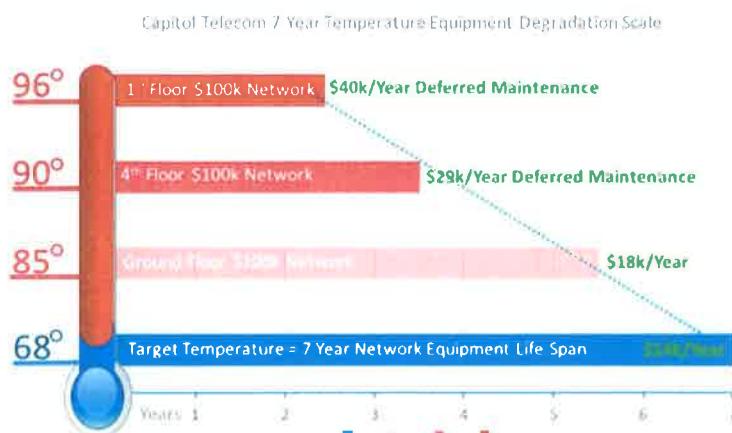
**SUBJECT:** Capitol Building AC Cooling Needs

This is to advise Legislative Council that cooling system upgrades are needed to specific areas of the Capitol Building. PDC Engineering has completed a professional assessment and is preparing a design bid packet for the areas noted in the table below. These areas have reached critical heat thresholds and the current low-cost cooling methods are insufficient.

The ideal temperature range for telecommunication equipment storage and operation is 68-72 degrees, which the ambient temperatures in these areas far exceed.

Location	Cooling Method	Risk	Temp
Ground Floor Telecom Room	Door/ceiling/wall holes and fans	Shortened equipment life/no expansion	$\leq 85^\circ$
Ground Floor Security Office	Open doors, fans	Exposes all security activity to public Exceeds OSHA recommended temps	$\leq 80^\circ$
Ground Floor Supply Office	Open window and fans for 5-6 staff during peak	Exceeds OSHA recommended temps	$\leq 80^\circ$
1 <sup>st</sup> Floor Telecom Room	Door/ceiling holes, fans and dump heat into adjacent legislator offices	Shortened equipment life/no expansion	$\leq 96^\circ$
4 <sup>th</sup> Floor Telecom Room	Door/ceiling holes and fans	Shortened equipment life/no expansion	$\leq 90^\circ$

Electronic equipment degradation costs more than double at these elevated temperatures as shown in the following graph:

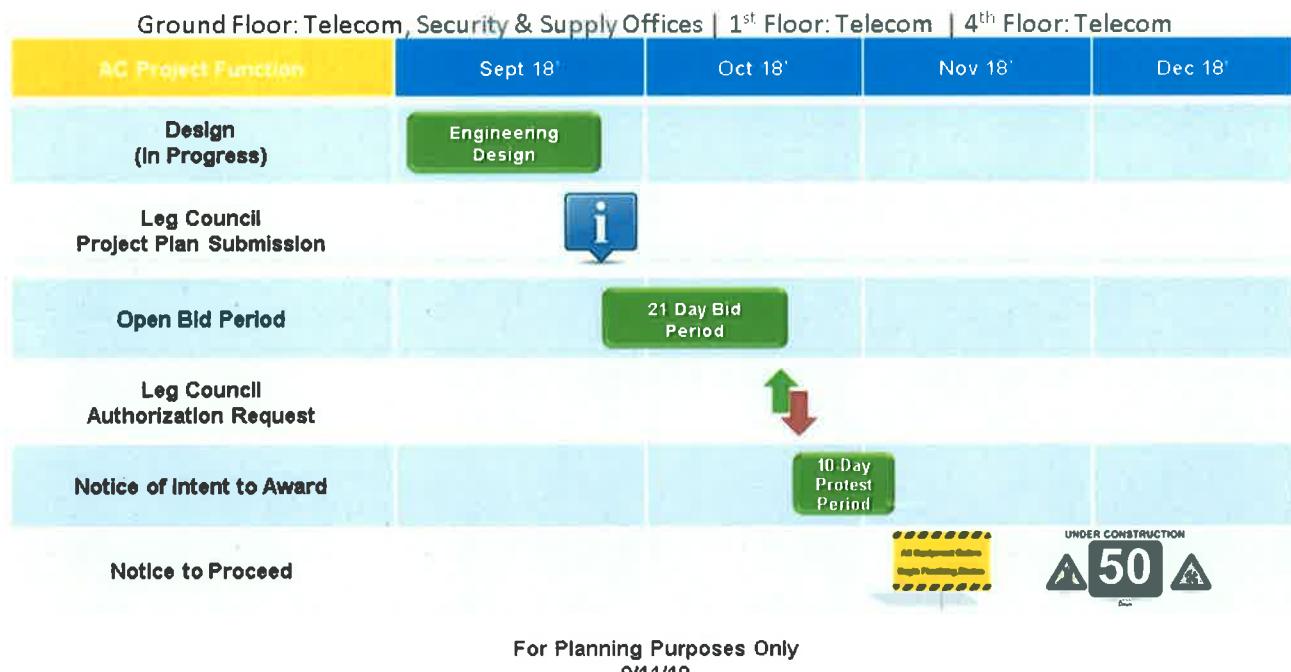


Attached please find PDC Engineering's Design Fee Proposal and Cooling System Design recommending a Ground/1<sup>st</sup> Floor mechanical cooling system installation and providing two options for a 4<sup>th</sup> Floor cooling system solution.

PDC Engineering anticipates having ready by October 1, 2018, the Invitation to Bid (ITB) design package; the Agency will then immediately issue an ITB. Once the ITB period closes, we will come back to Council for project approval.

A conceptual timeline is provided below.

## Capitol Building AC Cooling Remediation Timeline



This item is for information purposes only at this point and I am happy to answer questions or provide additional information.

Enclosures: PDC Engineers Design Fee Proposal and Cooling System Design



August 15, 2018

Tim Banaszak  
Information Technology Manager  
Alaska State Legislature  
State Capitol, Room 3

**SUBJECT:** Design Fee Proposal  
Capitol Building IT Room Cooling System Design

On July 24, 2018 Roger Smith, P.E. of PDC Engineers visited the Capitol building telecom closets and the ground floor security office that have been overheating. Following is a summary of our findings and recommendations for corrections, along with a mechanical and electrical design fee proposal.

### SUMMARY OF FINDINGS

The Ground Floor security office, Ground Floor IT telecom closet, 1<sup>st</sup> Floor IT telecom closet, and the 4<sup>th</sup> Floor telecom closet do not currently have any mechanical cooling and are overheating. These rooms have high internal equipment heat gains due to the amount of IT and camera equipment located in these spaces. Only a couple of the spaces have minimal ventilation/exhaust. The ventilation and exhaust air volume provided is too low to provide much, if any cooling.

The security office was found to have a room temperature in the low 80'sF, requiring the door to the public corridor to be left open which unfortunately allows the general public the ability to see the security camera monitors. The Ground floor telecom room was found to be in the mid 80's. The 1<sup>st</sup> floor and 4<sup>th</sup> floor telecom closets were measured to be in the low-mid 90F range. These high temperatures can lead to reduced equipment service life and equipment failure. In addition, the 1<sup>st</sup> floor telecom closet is located within one of the Representative's offices, causing that office to have air temperatures in the mid 80F range.

Ventilation air from the exterior can provide cooling to interior spaces when the outdoor air temperature is much cooler than the overheated interior space temp. However, when outdoor air temperatures are close to the maximum desired interior space temperature, there is little ability to cool with outdoor ventilation air alone, requiring very high fan air volume supply rates. For example, attempting to maintain an 80F room temperature with 70F outdoor air and an internal equipment heat gain of 2 tons (24,000 Btuh) similar to the load of each of the telecom rooms, requires approximately 2,150 CFM of outdoor air. This amount of air would require a supply fan and exhaust fan of similar size to the 2<sup>nd</sup> Floor Senate Chambers air handler and 18-inch diameter supply and exhaust air ducts. With the available ceiling space very limited, this is not a practical solution for this building.

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907 Capitol Avenue  
Juneau, AK 99801  
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**PALMER**  
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Palmer, AK 99645  
907.707.1215

**SOLDOTNA**  
170 E. Corral Avenue, Suite 2  
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## **RECOMMENDATIONS**

Due to the inability of an outdoor air ventilation system to provide sufficient cooling capacity for the telecom and security offices, we recommend that a mechanical cooling system be installed, similar to the VRV (Variable refrigerant volume) heat pump cooling system currently installed for the 2nd floor committee rooms. VRV heat pumps are very efficient and allow for the use of multiple indoor units to connect to a single outdoor rooftop unit via refrigerant piping, instead of ductwork. The following solution is proposed:

### Ground/First Floor System

System consists of an outdoor unit connected to (3) separate indoor cooling units with individual zone temperature control for each space. Refrigerant piping would be routed between the outdoor unit and the 3 interior cooling units.

- Outdoor unit – located near ground floor Copy room adjacent to exit doors to courtyard where old AC unit was located, or above the old generator room, or in the garden area.
- Security Office – Indoor cooling unit, ceiling mounted in 2x2 tiles
- Ground Floor IT room – Indoor cooling unit, wall mounted
- 1st Floor IT room – Indoor cooling unit, wall mounted

### Fourth Floor System – Option A – Connect to existing 2<sup>nd</sup> floor system

If the existing 2<sup>nd</sup> floor system has sufficient capacity, one solution option for the 4<sup>th</sup> floor is to connect an additional indoor unit to the existing interior refrigerant main located in the 5<sup>th</sup> floor attic space. Connecting to the existing system for the 4<sup>th</sup> floor telecom room cooling would be the least expensive option, however, would also eliminate any future cooling capacity of that existing system.

### Fourth Floor System – Option B – New outdoor unit located on Roof

System consists of an outdoor unit connected to (1) separate indoor cooling unit serving the 4<sup>th</sup> floor IT telecom room. Refrigerant piping would be routed between the outdoor unit and the interior cooling unit. The outdoor unit could be oversized to allow for future capacity.

- Outdoor unit – located on the roof adjacent the existing outdoor units.
- 4th Floor IT room – Indoor cooling unit, wall mounted

See attached cut sheets for proposed outdoor and indoor units.

## **SCOPE OF SERVICES:**

PDC Engineers will provide mechanical and electrical engineering design documents for the recommended VRV heat pump cooling system serving the Ground floor security office and the Ground floor, 1<sup>st</sup> floor, and 4<sup>th</sup> floor IT telecom closets.

PDC will provide one project design for the (2) separate cooling systems. Haight & Associates, Inc. will provide the electrical engineering work as a sub-consultant to PDC. The design proposal is a

PDC will provide one project design for the (2) separate cooling systems. Haight & Associates, Inc. will provide the electrical engineering work as a sub-consultant to PDC. The design proposal is a fixed fee proposal while the Construction Administration is T&E with a maximum limit. PDC proposes to complete the Design and CA work per the following fees:

- Mechanical and Electrical
  - Design (Lump Sum): \$13,939
  - Construction Admin (T&E to maximum): \$5,842

TOTAL \$19,781

Our fee proposal worksheets are attached.

We understand that the design work needs to be completed as soon as possible, thus we plan to complete mechanical and electrical design documents within **3 weeks** of Notice to Proceed.

The fees and services are based on our understanding of the project and the following assumptions.

1. PDC will provide Mechanical and Electrical Engineering design services for the recommended cooling system identified above. Either Option A or Option B will be selected early in the design process for the 4<sup>th</sup> Floor cooling solution.
2. All submittals will be produced for electronic distribution.
3. Bid Document printing and distribution will be completed by the State of Alaska.
4. Division 0 and Division 1 Specifications are not included in this fee proposal.

Thank you for this opportunity and we look forward to working on this project with you. Please call if you have any questions or comments.

Sincerely,



Roger Smith, PE  
PDC Project Manager  
Senior Mechanical Engineer

Encl: Fee Proposal