CITY/BOROUGH OF JUNEAU
ALASKA'S CAPITAL CITY

To: Rod Swope, City Manager
Kim Kiefer, Deputy City Manager

From: Marc Matsil, Director, Parks & Recreation

Subject: FY 11 Marine Passenger Fee Proceeds Recommendations

Date: December 21, 2009

1. Centennial Hall Roof Replacement:

Centennial Hall is an invaluable resource for Juneau's visitors. As Juneau's primary Emergency Shelter for local and regional emergencies, Centennial Hall has served in this capacity for a number of cruise ship and other incidents. These include the 2008 grounding of the Empress of the North where Centennial Hall provided emergency shelter services (medical, food, and counseling) to the dozens of visitors engaged in the emergency evacuation.

Other cruise ship incidents where Centennial Hall was utilized as an Emergency Shelter—or was on emergency shelter stand-by include the 1996 Universal Explorer incident, 1995 Star Princess grounding, and Spirit of Glacier Bay grounding. Aside from providing support to Juneau's numerous visitors during emergency situations, Centennial Hall also supports the greater community during emergency incidents. These include fires, the recent mudslide on Gastineau Avenue and others. The Juneau Convention & Visitors Bureau also staffs a visitor's center at Centennial Hall.

In FY 2009, Marine Passenger fee proceeds provided $368,600 for the Juneau Arts and Culture Center (JACC) for roof repairs. The JACC serves as an emergency shelter back-up to Centennial Hall.

Project Description:
In 2009, Jensen Yorba Lott (JYL) conducted a roof condition assessment for Centennial Hall (attached) and recommended replacement. The facility was constructed in 1984. The building consists of an 8,500 square foot assembly hall surrounded by one story support space. The roof structure consists of steel beams and trusses supporting a variety of steel deck types. The original roof assembly consists of approximately 10 pounds per square

foot of washed, round rock approximately 1.5" diameter installed over filter fabric over two layers of extruded polystyrene insulation, 6" thick total.

At 24 years of age, the asphalt roof membrane has served a long service life. JYL stated that virtually all materials above the roof membrane should be replaced. The recommended roof assembly should consist of the following:
Separation board: (where required), ½" DensDeck mechanically fastened through the existing membrane and gypsum sheathing into the existing 18 or 20 gage steel deck. Insulation: R 38 (average) consisting of a layer of tapered insulation (1/4" per foot) a minimum of ½" thick, over a board of constant thickness.
Cover board: ½" Dense Deck or 7/16 OSB, adhesively applied to the insulation.
Membrane: 90 mil EPDM; 80 mil TPO or 80 mil PVC, adhesively applied to the cover board.

Recent experience with similar membrane assemblies (EPDM at the Juneau Airport, and PVC at the Valley Pool) suggest a cost range of between $30/sf and $38/sf. The roof area of the Centennial Hall is 31,500 sf. JYL's estimated cost for roof replacement is **$1,300,000 (see below).**

Marine Passenger Fee Proceeds Request:	**$650,000.00**
CBJ Contribution:	**$650,000.00**
Total:	**$1,300,000.00**

Centennial Hall
Roof Replacement
Preliminary Construction Cost Estimate
Building Area Summary:
Roof Area to be replaced: 31,500 sf
Note: all prices include labor and material
BASIC BID

Existing roofing to existing membrane 31,500 sf $2.00	$63,000
Demo parapet cap, flexible base flashing 1,500 lf $4.00	$6,000
Demo roof to wall flashing 350 lf $5.00	$1,750
Demo flashing at sky lights 150 lf $2.00	$300
remove roof mounted mech 1 ls $3,000.00	$3,000
	Subtotal $74,050
Roof Replacement	
1/2" densdeck underlayment (at stl deck) 15,000 sf $2.00	$30,000
3" polyisocyanurate insulation 31,500 sf $5.00	$157,500
tapered insulation 31,500 sf $3.50	$110,250
1/2" densdeck coverboard 31,500 sf $2.00	$63,000
80 mil tpo, fully adhered 10,500 sf $7.00	$73,500
clean, reinstall grate, bowl at rf drains 15 ea $500.00	$7,500
vent pipe flashing 1 ls $500.00	$500
reinstall roof mounted mech 3 ea $750.00	$2,250

roof to wall flashing and base 350 lf $75.00		$26,250
perimeter flashing and base flashing 1,500 lf $75.00		$112,500
Skylite Flashing 150 lf $50.00		$7,500
Miscellaneous Additional work 1 ls $20,000.00		$20,000
		Subtotal $610,750
General Conditions		
Mobilization/demobilization 1 ls $10,000		$10,000
Freight 1 ls $15,000		$15,000
Supervision 3 mos $12,000		$36,000
Clerical/Expediting/Admin 3 mos $2,000		$6,000
Temporary Facilities (tenting, etc) 3 mos $5,000		$15,000
Miscellaneous motorized equipment 3 mos $2,500		$7,500
Tools 3 mos $1,700		$5,100
Consumables, fuel etc 3 mos $1,000		$3,000
Disposal 3 mos $2,000		$6,000
Home Office Expenses 3 mos $2,500		$7,500
		Subtotal $111,100
	Subtotal, Labor and Materials	$795,900
Mark Ups		
Contractors Overhead/Profit 10.00%		$79,590
Bonding 1.50%		$11,939
Insurance 1.50%		$11,939
Estimating Contingency 10%		$79,590
		Subtotal $183,057
Total Construction Costs		$978,957
Project Cost Design 10%		$97,896
Administration 20%		$195,791
		Subtotal $293,687

Total Project Cost $1,272,644.

Marine Passenger Fee Proceeds Request:	**$650,000.00**
CBJ Contribution:	**$650,000.00**
Total:	**$1,300,000.00**

AUGUST 19, 2009

JUNEAU CENTENNIAL HALL ROOF CONDITIONS ASSESSMENT

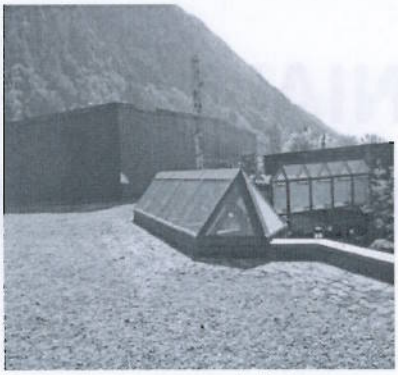
Jensen Yorba Lott Inc

Jensen Yorba Lott, Inc 522 W 10th St. Juneau, AK 99801 907-586-1070

Existing Building Description

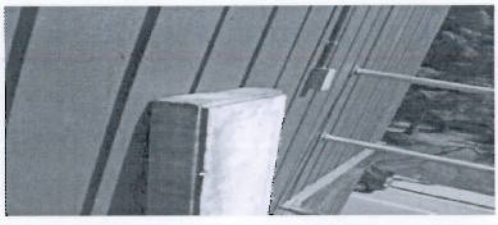
The Juneau Centennial Hall was constructed in 1984 from drawings prepared by Ackley Jensen Architects in Joint Venture with John Graham Company. It is a steel framed Type II FR, sprinkled building of non combustible construction with fire retardant treated wood siding. Structure is fire protected with a one hour roof assembly, per the 1979 UBC. The occupancy type is A2.1. The building consists of an 8,500 s.f. assembly hall surrounded by one story support space. There are small, two story mechanical spaces to the northwest and southeast.

The roof structure consists of steel beams and trusses supporting a variety of steel deck types. The main assembly hall roof, the northwest and the southeast mechanical room roofs are 1-1/2" deep, 18 gage steel deck sloped at approximately 2% to perimeter roof drains. The lower roof is mostly 3" deep, 20 gage steel deck with 2.5" concrete slab, all installed dead level. The exception is the relatively small roof areas to the north and south of the main exhibition hall, which are 1-1/2" deep, 18 gage steel deck, sloped at 2%.



Code Issues

Using the current 2006 IBC, the existing building would generally be classified as A.3 occupancy, and the type of construction is now Type II A, sprinkled. The roof assembly is to be one hour rated. The roof over the main exhibition hall is omitted from the one hour fire resistive requirement because it is higher than 20 feet above the floor below (IBC Table 601, exception C). Remaining low roof areas with 2.5" concrete meet the one hour fire resistive assembly requirement per UL N706. The roof must be Class B per IBC table 1505.1. The design wind speed at this location is 110 mph, Exposure D, and we assume an importance factor of 1.15.



Roof Description

The original roof assembly consists of approximately 10 pounds per square foot

of washed, round rock approximately 1.5" diameter installed over filter fabric over two layers of extruded polystyrene insulation, 6" thick total. The insulation is assumed to be installed over a loose laid roof membrane over a loose laid ½" gypsum sheathing where the roof deck is installed over steel deck. It is assumed that the gypsum sheathing is omitted at the concrete slabs. Because the roof is installed in an inverted roof membrane (IRMA) configuration, there is no vapor barrier. Channels are provided in the roof insulation to promote drainage to the existing roof drains. The entire roof perimeter is lined with 6 rows of 8x16x1.5 concrete ballast pavers.

The exact type of roof membrane is unclear. During our site visit we uncovered a portion of the existing roof in the area where the structural deck is a concrete slab. The membrane uncovered during our site visit was an asphalt membrane, which if installed in the conventional manner would be hot applied to the concrete deck. It is assumed that the same asphalt membrane is installed at the high roof over the assembly hall. We have seen similar installations in large buildings of the same age, such as the Ketchikan Pioneer Home and it is likely that the asphalt membrane was installed over a mechanically fastened gypsum sheathing deck.

The perimeter walls are capped with aluminum coping and a continuous aluminum wall flashing. Virtually none of the roof or wall membrane is exposed to the exterior. The flashing has an exposed fastener at the inside face, and a concealed retainer clip at the outside face. This was a wise choice because of the large number of ravens, crows and seagulls that regularly frequent the Centennial Hall Roof.

Other similar buildings have experienced significant damage due to bird activities on both horizontal and vertical EPDM membranes to the point that the roof had to be replaced.

There is a large sloping skylite structure at the south side of the building. The base of the skylite includes a counterflashing similar to a Fry "Springlok" type counterflashing so that the membrane roofing can be removed without disturbing the skylite frame.

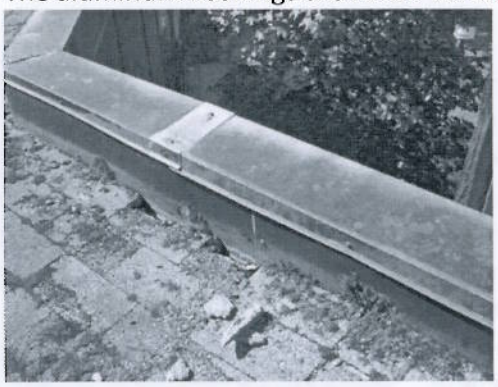
The skylite system itself is a wet glazed system, and is glazed with silicone sealant and appears to be in good condition.

At some point after the original construction leaks at the perimeter walls were experienced. These leaks were apparently due to a lack of expansion capability at the roof to wall connection. When the roof is heavily loaded, such as after a snow event, roof deflection can break the roof membrane along the roof to wall joints. As a result, a follow on project occurred, in which the original asphalt wall flashing was replaced with a Firestone EPDM membrane, over what appears to be a closed cell foam rod which is used as a roof to wall expansion joint. The membrane was bedded to the existing roof membrane and the insulation re-installed. This measure apparently corrected the leaks. This appears to be the only modifications to the roof assemblies since the original construction.

Conditions:

The roof is reported to leak in a few areas but has generally performed well. The IRMA roof configuration is a poor insulator, as much of the heat desired to be saved is in fact washed down the roof drains. This is especially true in the dead level configuration of this roof where a constantly flowing stream of water runs between the insulation and the roof membrane. The ballast stones are barely visible in a number of locations due to the heavy moss build up. The ballast pavers are significantly deteriorated in many locations, so much so that they crumble upon contact. The extruded insulation contains a significant amount of water. According to manufacturer Dow Corning, the exposed insulation is subject to freeze thaw cycles, often while wet. Eventually the expanding water crystals begin to break down the insulation, forming voids that fill with water, repeating and speeding up the process. The membrane is well protected, and is likely in fair condition. The prognosis is uncertain. We exposed the membrane at two locations, at the roof to wall joint and in the field next to a roof drain. At 24 years of age, the asphalt roof membrane has served a long service life and appeared to be in good condition. At the roof to wall joint the there is concern about the base flashing on two regards. First, the adhesives used to connect and seal the EPDM seams is breaking down. Secondly, the connection of the EPDM base flashing to the asphalt membrane is an unusual condition requiring intermediate materials which likewise can be breaking down.

The aluminum flashings are in fair condition. The aluminum is not badly deteriorated, but the factory finish is beyond its useful life. The fasteners are likewise disintegrating.



Roof drains appear in fair condition. The compression rings are corroded, but because of the cast iron material still have significant service life, as do the cast metal grates.

The following is a summary of the condition of the primary roof materials :

Gravel: heavily contaminated with moss;
Ballast pavers: disintegrating
Insulation: waterlogged
Base flashing: beginning to show evidence of seam failure
Asphalt membrane: fair to good condition
Flashing: fair to poor condition

Prognosis

Virtually all materials above the roof membrane should be replaced. Since the IRMA configuration is significantly less energy efficient than other options, we believe the best solution would be to remove all roof materials down to the asphalt roof membrane which could be used as a use it as a vapor barrier and install a conventional exposed membrane roof over an appropriate thickness of tapered insulation. However, the existing asphalt membrane is likely not fully adhered to the base materials below since it was a ballasted assembly. In similar applications we have mechanically installed a separation board over the existing membrane and proceeded with the roof assembly. However, the existing concrete deck that occurs in a significant area of the roof can make this approach problematic on two regards. The mechanical fasteners can be difficult to install into a concrete deck, and could be potentially difficult to remove in future roof replacement projects. It is appropriate to consider the roof replacement as two separate problems- the existing roof membrane/deck and all other roof components. They will be considered in the following Roof Options section.

Roof Replacement Options:

From our experience in Southeast Alaska there are certain givens to roof successful roof assemblies. There are essentially three roof membranes to be considered in a large institutional low slope roof: Thermopolyolofin (TPO); Polyvinyl Cloride (PVC);

Ethylene Propylene Diene Monomer (EPDM). Metal roofs generally are not suitable for large scale low slope institutional applications. The appearance is often overly industrial looking, rain and snow runoff is difficult to manage, the roof to wall details are often difficult to maintain, and long term weather proof warranty support is often lacking. Asphalt, both built up and torch down roofing requires significant, ongoing maintenance that is generally found unacceptable for large institutional roofs. And, while EPDM roof membranes have fared notoriously poorly when subjected to bird activity, Carlisle Syntec and other manufacturers have now produced a 75 mil and 90 mil EPDM that includes a warranty for bird damage. EPDM is a proven product, properly manufactured the material itself is virtually indestructible. The weak point of a EPDM roof has always been in the seams, which rely on an adhesive. PVC is extremely durable, with much higher puncture resistance than EPDM. It is also a welded membrane, with seams hot air welded so that the membrane melts together and forms a virtually indestructible bond when properly installed. Unlike other roofing types, once the membrane is welded correctly, it stays bonded for the life of the roof. The primary drawback to PVC is the price, sometimes nearly double that of EPDM. TPO is the newest of the three roof membranes, having a record of commercial use of only about 7 years in the United States. It is even more puncture resistant than PVC, and welds with the same equipment as PVC. It is very stiff however, and can be difficult to work with around complex roof shapes. There are fewer experienced installers in SE Alaska than PVC or EPDM. TPO is cheaper than either of the other two membranes. We recommend that these membranes be installed in an exposed membrane fully adhered configuration if time and budget allow. This configuration is the most durable, strongest application, affording the highest wind uplift values and the best warranty coverage. It is the most weather dependent in terms of installation however, so it is important to install them in the best time of year. It is difficult to determine the most cost effective of these three roof membranes. The roofing industry is extremely competitive, and we have found that it is most advantageous to allow more than one membrane to be considered for installation. The best way to accomplish this is to detail the roof so that more than one membrane can be used, establish one membrane as a base bid, and then allow one or more others as alternate bids. This is a simple and extremely effective way to obtain the most value for the construction dollar while still maintaining control of product quality .

In a similar fashion, competition among the manufacturers of rigid insulation is extremely tight. The various insulation manufacturers have marketing arrangements with membrane manufactures. Some roof membrane manufacturers have bought insulation manufacturers and market them exclusively. Others refuse to warrant any but the particular type that they produce. We have found that the most cost effective approach is to allow all three of the primary roof insulation types- Polyisocyanurate, expanded polystyrene and extruded polystyrene. They should be specified as R Value rather than thickness, with R value rated as an average R value over 15 years- this evens the playing field between the

manufacturers because Polyiso insulation actually looses R value over time, so it must start out thicker in order to maintain a particular average value. Some of the roof areas of this building are dead level, others are sloped. It is recommended that an average R value be established for the areas requiring tapered insulation. This same average R value can be used for the constant thickness insulation. Establishing the actual optimum R value based on the heat loss, energy cost, etc. is beyond the scope of this document, so we will use an average of R-38, unless otherwise directed.

Base and Separation board: The existing roof membrane is installed over a steel deck in some areas, and concrete slab elsewhere. It is simple to utilize the existing membrane as a vapor barrier at the steel deck areas and mechanically fasten a separation board over it. As long as care is taken to avoid driving fasteners through existing mechanical or electrical equipment , this approach will serve to secure a workable base for subsequent layers of roofing. At the concrete decks a viable option would be to remove the existing roof membrane down to the bare concrete deck, which could then form the base for the follow-on roof assembly, thus omitting the separation board. We recommend Georgia Pacific "Dens Deck" for the separation board, where required. It is extremely durable, has a strong record of successful application, and is proven to be virtually impervious to water. We also recommend either Dens Deck or 7/16" OSB for the cover board (the panel between the insulation and the membrane). The actual material selected depends on the manufacturer, their testing (especially with adhered roofing systems) and the manufacturer preferences. Again, leaving options available for the installation allows greater competition and further cost savings.

Because the Centennial Hall is a facility of significant import to the community, it should remain in operation throughout the roof replacement project. For that reason, we believe that an adhered roof assembly should be used for the entire roof assembly, utilizing low VOC adhesives where practical. This approach offers some significant advantages:

- The installation is relatively quiet, with very little vibration or low frequency noises produced that can be particularly disturbing and difficult to mask.
- The roof assembly is very fast if weather conditions can be controlled.
- The use of low VOC adhesives where possible greatly reduce the disturbance of building occupants. Unlike solvent based adhesives or hot mopped adhesive, there is very little odor or chemical contamination that can enter an air system and render the building unfit to occupy. Occupants may not even be aware work is proceeding.
- Adhered roof assemblies have the highest wind uplift ratings.

The adhesive will likely depend on the manufacturers testing and marketing arrangements, but is preferable to use a two part foamed polyurethane foam adhesive for the various roofing sub-components. The membrane should be

adhered with the manufacturers proprietary water based adhesive. This approach is well documented for success, is supported with warranties, and is relatively low odor producing.

We recommend that the metal parapet flashing be replaced with aluminum of similar gage and configuration as the existing flashing. The walls are made from treated wood and plywood, either preservative treated or fire retardant treated. Either one can be reactive to ferrous metals. The aluminum has fared very well in this application and we recommend repeating it. We suggest that the aluminum not be painted, but rather be dark bronze anodized to match the existing building.

The skylite is faring very well, and while it could be considered for resealing, it does not appear to be a critical at this time. The silicone sealant is essentially a 50 year product, and is only halfway through its service life. Since it is not leaking, we suggest it remain in place.

Summary:

The recommended roof assembly should consist of the following:

Separation board: (where required), ½" DensDeck mechanically fastened through the existing membrane and gypsum sheathing into the existing 18 or 20 gage steel deck. The additional separation board may be omitted if the existing membrane is hot applied to the existing concrete deck.

Insulation: R 38 (average) insulation consisting of a layer of tapered insulation (1/4" per foot) a minimum of ½" thick, over a board of constant thickness. The insulation should be adhesively applied.

Cover board: ½" Dense Deck or 7/16 OSB, adhesively applied to the insulation.

Membrane: 90 mil EPDM; 80 mil TPO or 80 mil PVC, adhesively applied to the cover board.

Recent experience with similar such membrane assemblies (EPDM at the Juneau Airport, and PVC at the Valley Pool, suggest a cost range of between $30/sf and $38/sf including 30% general conditions, not including contingencies. The roof area of the Centennial Hall is 31,500 sf, so we would predict a comprehensive roof replacement between $1,000,000 and $1,200,000, exclusive of contingencies. A budget cost estimate will follow.

CENTENNIAL HALL
Roof Replacement
Preliminary Construction Cost Estimate
17-Aug-09

Building Area Summary:

Roof Area To be Replaced: 31,500 sf

Note: all prices include labor and material

BASIC BID

Element	Item	Quantity	Unit	Unit Cost	Subtotal	Total
Demolition						
	Existing roofing to existing membrane	31,500	sf	$2.00	$63,000	
	Demo parapet cap, flexible base flashing	1,500	lf	$4.00	$6,000	
	Demo roof to wall flashing	350	lf	$5.00	$1,750	
	Demo flashing at skylites	150	lf	$2.00	$300	
	remove roof mounted mech	1	ls	$3,000.00	$3,000	
	Subtotal					$74,050
Roof Replacement						
	1/2" densdeck underlayment (at stl deck)	15,000	sf	$2.00	$30,000	
	3" polyisocyanurate insulation	31,500	sf	$5.00	$157,500	
	tapered insulation	31,500	sf	$3.50	$110,250	
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	clean, reinstall grate, bowl at rf drains	15	ea	$500.00	$7,500	
	vent pipe flashing	1	ls	$500.00	$500	
	reinstall roof mounted mech	3	ea	$750.00	$2,250	
	roof to wall flashing and base	350	lf	$75.00	$26,250	
	perimeter flashing and base flashing	1,500	lf	$75.00	$112,500	
	Skylite Flashing	150	lf	$50.00	$7,500	
	Miscellaneous Additional work	1	ls	$20,000.00	$20,000	
	Subtotal					$610,750
General Conditions						
	Mobilization/demobilization	1	ls	$10,000	$10,000	
	Freight	1	ls	$15,000	$15,000	
	Supervision	3	mos	$12,000	$36,000	
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	Temporary Facilities (tenting, etc)	3	mos	$5,000	$15,000	
	Miscellaneous motorized equipment	3	mos	$2,500	$7,500	
	Tools	3	mos	$1,700	$5,100	
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	Disposal	3	mos	$2,000	$6,000	
	Home Office Expenses	3	mos	$2,500	$7,500	
	Subtotal					$111,100
	Subtotal, Labor and Materials					$795,900
Mark Ups						
	Contractors Overhead/Profit			10.00%	$79,590	
	Bonding			1.50%	$11,939	
	Insurance			1.50%	$11,939	
	Estimating Contingency			10%	$79,590	
	Subtotal					$183,057
Total Construction Costs						$978,957
Project Cost	Design			10%	$97,896	
	Administration			20%	$195,791	
	Subtotal					$293,687
Total Project Cost						$1,272,644