MEMORANDUM

CITY OF WINDOM
444 9th Street
Windom, MN 56101
Phone: 507-831-6129
Fax: 507-831-6127
www.windom-mn.com

TO: City Council
FROM: ESF Building Committee
DATE: August 9, 2016
RE: Emergency Services Facility – Cost Estimate with Building Committee Recommendations

Attached is a spreadsheet showing the bid pricing for the proposed project including the recommendations from the Emergency Services Facility (ESF) Building Committee.

Exhibit A shows the results of the bid show that the apparent low bidder would have a total development cost, with professional fees and all alternates, of $4,107,466. The comparable architect's estimate was $4,562,262. This relates to a bidding cost that is about 10% lower than the original cost estimate.

When the ESF Building Committee reviewed the bidding costs they considered the alternates and have the following recommendations:

- Alternate #1 – Include the 4th Ambulance Bay for $99,000
- Alternate #2 – Eliminate the front entrance canopy ($24,200)
- Alternate #3 – Eliminate the monument wall ($38,000)
- Alternate #4 – Do not accept the glass overhead doors ($64,100)
- Alternate #5 – No recommendation on the TPO Roof (Council decision)
- Alternate #6 – Include the wiring for future generator for $2,000
- Alternate #7 – Do not accept the radiant heat feature ($10,900)
- Alternate #8 – Accept elimination of the limestone block form liner ($30,200)

Exhibit B is the total development cost worksheet with the ESF Building Committee recommendations for a total of $3,886,440. This total is 15% less than the original cost estimate due to the elimination of several design features and a slight decrease in the contingency amount.

Please note that the Alternate for the TPO roof (see Exhibit C for explanation of this roofing type) is not included in the cost outlined above. The ESF Building Committee deferred to the City Council on this item as it was a request from Council that it be included in the bid pricing.

It is important to note, the contingency shown as $159,575 in Exhibit B is a project reserve in the event of unforeseen issues or change orders that may add to the price. If the contingency money is not spent that could be used for a debt service reserve, be used for furniture, fixtures and equipment for the ESF, used to repay the General Fund for design expenses or repay the Electric Department for work related to the ESF.

Exhibit A

PROJECT DEVELOPMENT COST FOR:

Windom EMS Building

BRUNTON ARCHITECTS & ENGINEERS

Date: 8/8/2016

Development Name		Cost	Description/notes
CONSTRUCTION COSTS			
Base Bid	$3,120,700.00	$3,120,700.00	Gosewisch Construction 7/27/2016
Alternate #1	$99,000.00	$99,000.00	4th Ambulance bay
Alternate #2	$24,200.00	$24,200.00	Front entrance canopy
Alternate #3	$38,000.00	$38,000.00	Monument wall
Alternate #4	$64,100.00	$64,100.00	Glass O.H. doors
Alternate #5	$43,100.00	$43,100.00	TPO Roof
Alternate #6	$2,000.00	$2,000.00	Future generator
Alternate #7	$10,900.00	$10,900.00	Radiant heat
Alternate #8	-$30,200.00	$0.00	Limestone block form liner
Contract Amount	$3,371,800.00	$3,402,000.00	
Contingency	5.0%	$170,100.00	
	Total Construction Cost	**$3,572,100.00**	
PROFESSIONAL FEES			
Architecture & Eng. Fe	6.6%	$222,538.80	base bid + all alternates
Architectural C/A	1.5%	$50,577.00	Estimated costs
Architectural Reimbursables		$2,500.00	Printing, mileage
Building Permits			Included in base bid
Soil Borings/ Testing			Included in arch. fee
Asbestos/ Lead Testing			N/A
Other	Predesign	$7,950.00	
Other	Special Inspections	$21,000.00	
Other			
	Total Professional Fees	**$304,565.80**	
OTHER FEES			
Bonding Cost			
Title Fees			
Inpection Fees			
Other	Furniture		
Other	Data Low Voltage	$30,800.00	
Other	Tennis Court re-location	$150,000.00	
Other	Site Prep Allowance	$50,000.00	
	Total Other Fees	**$230,800.00**	
TOTAL DEVELOPMENT COSTS			
	Total Development Costs	**$4,107,465.80**	

Exhibit B

PROJECT DEVELOPMENT COST FOR:

Windom EMS Building - Committee Recommendation

BRUNTON ARCHITECTS & ENGINEERS

Date: 8/8/2016

Development Name		Cost	Description/ notes
CONSTRUCTION COSTS			
Base Bid	$3,120,700.00	$3,120,700.00	Gosewisch Construction 7/27/2016
Alternate #1	$99,000.00	$99,000.00	4th Ambulance bay
Alternate #2	$24,200.00	$0.00	Front entrance canopy
Alternate #3	$38,000.00	$0.00	Monument wall
Alternate #4	$64,100.00	$0.00	Glass O.H. doors
Alternate #5	$43,700.00	$0.00	TPO Roof
Alternate #6	$2,000.00	$2,000.00	Future generator
Alternate #7	$10,900.00	$0.00	Radiant heat
Alternate #8	-$30,200.00	-$30,200.00	Limestone block form liner
Contract Amount	$3,371,800.00	$3,191,500.00	
Contingency	5.0%	$159,575.00	
	Total Construction Cost	**$3,351,075.00**	
PROFESSIONAL FEES			
Architecture & Eng. Fe	6.6%	$222,538.80	base bid + all alternates
Architectural C/A	1.5%	$50,577.00	Estimated costs
Architectural Reimbursables		$2,500.00	Printing, mileage
Building Permits			Included in base bid
Soil Borings/ Testing			Included in arch. fee
Asbestos/ Lead Testing			N/A
Other	Predesign	$7,950.00	
Other	Special Inspections	$21,000.00	
Other			
	Total Professional Fees	**$304,565.80**	
OTHER FEES			
Bonding Cost			
Title Fees			
Inpection Fees			
Other	Furniture		
Other	Data Low Voltage	$30,800.00	
Other	Tennis Court re-location	$150,000.00	
Other	Site Prep Allowance	$50,000.00	
	Total Other Fees	**$230,800.00**	
TOTAL DEVELOPMENT COSTS			
	Total Development Costs	**$3,886,440.80**	

Note: ESF Building Committee did not make a recommendation on the roof alternate. Council decision.

Exhibit C

TPO: Getting Better with Age

TPO has grown up. By any criteria, TPO is no longer the new kid on the block, when it comes to commercial/industrial roofing. In fact, TPO (Thermoplastic Polyolefin) continues to be the fastest growing commercial roofing membrane on the market today, having grown to over 40% of the installed sq ft in the U.S. in the past seven years.

Industry reports show that nearly 1.2 billion square feet of TPO was installed in 2013. Its growth and market acceptance continue to outpace the overall commercial roofing market. TPO is clearly leading the trend to white, reflective, energy efficient, heat welded single ply roofing systems.

While TPO can now be considered a mature product, it didn't get there without growing pains. TPO roofing membranes were first used in Europe in the 1980s. In 1992 TPO was introduced to the US. Some manufacturers with little or no experience were attracted to the new TPO market. In its infancy, the TPO industry did not have the strict standards that it has today. In fact, the ASTM standard for TPO is now the most stringent of any single ply roofing material (see chart below).

Initially, some manufacturers had performance issues resulting in material failures. Formulation trial and error was not uncommon. This left some to question the durability of TPO. Today those issues have largely been eliminated. Many of the early manufacturers are either out of the business or have refined their original formulas and manufacturing process to solve their initial performance problems. The evolution of TPO was very similar to other commercial roofing materials like EPDM and PVC where trial and error has eventually resulted in quality materials over time. It only took 8 years after its initial introduction for TPO to make serious inroads in the US. One growth factor was the entry into the TPO market by well established companies, such as Firestone Building Products, with significant experience in polymer engineering and manufacturing of rubber products.

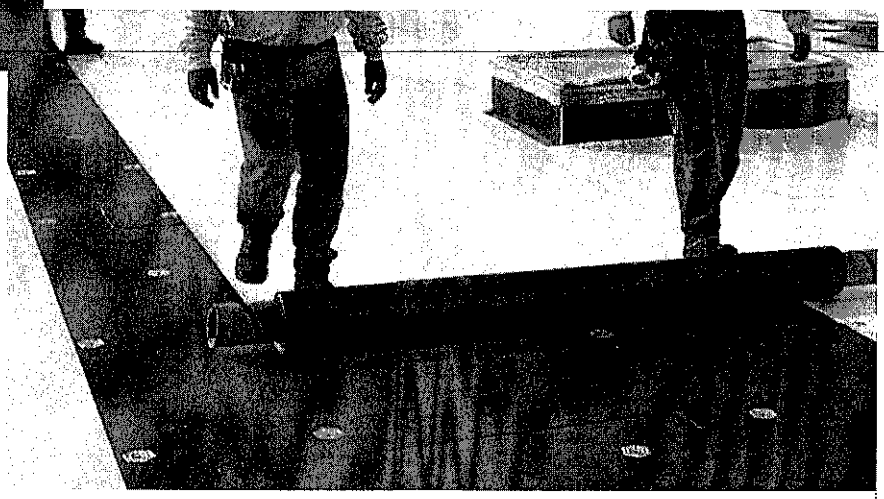
The companies that remained along with other key stakeholders have helped drive today's exacting performance specifications. Professional standards have brought a welcomed and necessary degree of credibility to the TPO manufacturing community. Not to mention peace of mind to architects, contractors and building owners.

TPO is a member of the thermoplastic single-ply membrane family, which includes PVC. TPO is a polypropylene based plastic and ethylene/propylene rubber. The plastic and rubber blend enables TPO membranes to be durable and remain flexible even in low temperatures.

	TPO (old ASTM)	TPO (new ASTM)	EPDM	PVC	KEE
ASTM Standard	D6878	D6878	D4637	D4434	D6754
Xenon Arc					
Temperature	80° C	80° C	80° C	63° C	63° C
Hours @ 0.35 W/m²	8,000	8,000	4,000	5,000	5,000
Oven Aging					
Temperature	116° C	116° C	116° C	80° C	80° C
Days	28	224	28	56	56

There is a common misperception that one TPO is the same as another. This is not true. The major TPO producers each have their own formula/chemistry, product design and manufacturing process. It's important to understand that every manufacturer makes their own version of TPO.

TPO: Getting Better with Age



High-quality TPO starts with good chemistry. Good chemistry is essential to engineering the right polymer. This is a critical consideration because the polymer is the backbone of the product. It is the base that allows all the other elements that go into the TPO formula to work together for the desired results.

Technically speaking, the polymer is crucial if the UV stabilizers, fire retardants, titanium dioxide, antioxidants and heat stabilizers are to do their jobs. TPO like all polymers is subject to degradation by UV and heat. This problem is mitigated through the use of stabilizers. Stabilizers slow polymer breakdown. It too needs to be compatible and work with all the other formulation components. Incompatibility can lead to premature degradation.

Finding the correct combination of raw materials and a formulation, enabled by the right polymer is what good chemistry is all about. Perhaps this challenge is one reason why only a handful of companies today have the resources to manufacture TPO.

TPO's acceptance by the commercial roofing marketplace is really no mystery. Once the performance issues were resolved, building owners, architects and contractors could objectively analyze the many benefits of TPO.

TPO single-ply roofing membranes provide exceptional resistance to ozone, ultraviolet rays and some chemical exposure. Achieving these performance characteristics are the result of the individual ingredients that go into the TPO formulation.

Because TPO is a thermoplastic it can be heat welded. This creates a monolithic roof while providing strength and durability.

Ultraviolet light stabilizers are critical in that they provide weathering resistance and long-term strength. Fire retardants like magnesium hydroxide (non-halogenated) provide TPO with fire resistance without negatively affecting the UV stabilization package or harming the environment.

Titanium dioxide pigments determine the color of the membrane and help provide increased whiteness and reflectivity. Heat stabilizers help resist heat degradation from the manufacturing process and after installation.

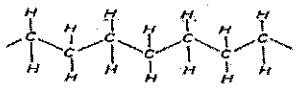
PVC (polyvinyl chloride) is another member of the thermoplastic single-ply membrane family. At first glance it is easy to see the similarities of both products. TPO and PVC are thermoplastic materials. Being heat weldable is another important shared characteristic. Heat welds provide a monolithic seam that prevents water intrusion. Both are considered "cool" as a result of their white color which makes them reflective and resistant to the sun's heat and ultraviolet rays. Buildings with reflective roofs can stay cooler inside and save on air conditioning costs.

High-quality TPO starts with good chemistry. Good chemistry is essential to engineering the right polymer.

The installation processes for TPO and PVC are nearly identical. Both require the same type of attachment materials, tools, procedures and skills. They can be mechanically attached or fully adhered. Both membranes are resistant to chemicals, grease and oil (to varying degrees). They are puncture resistant and can be easily repaired. Both are flexible and designed to conform to the movement of the roof.

On the surface, it could appear that these two thermoplastic family members are very much alike. However, there are major differences. It's in the chemistry where the similarities end. So while TPO and PVC are in the same thermoplastic family, they are chemically unrelated. TPO, is a naturally flexible polymer based material and does not require additives to achieve its flexibility.

Polypropylene



Poly Vinyl Chloride (PVC)

The TPO white reflective membrane meets criteria of LEED®, ENERGYSTAR®, and other environmental programs. No roof lasts forever and one of the major environmental advantages of TPO is that it can be easily recycled with other plastics. The recyclable nature of TPO is a primary consideration for companies committed to the stewardship of our shared planet.

Most people think of PVC as the hard plastic piping they find at the hardware store. This solid, non-flexible state of PVC creates the most significant difference between TPO and PVC.

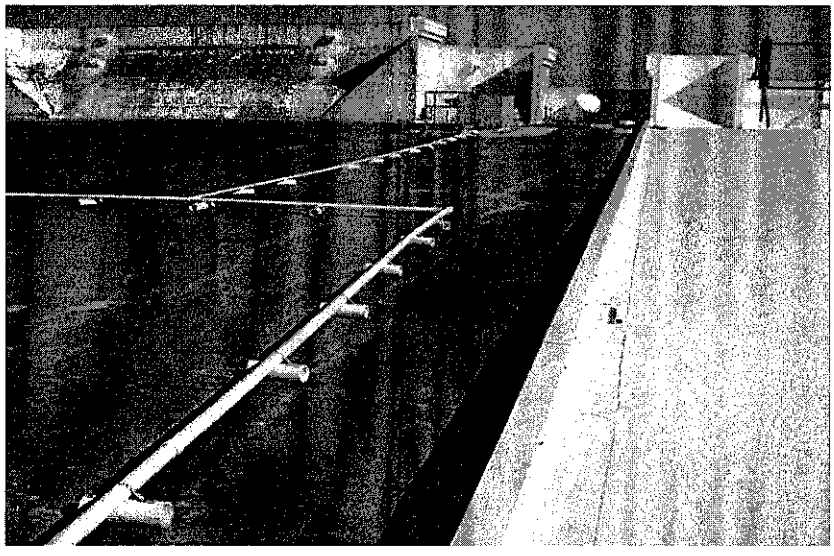
As a result of its normal hard solid state, PVC, unlike TPO, requires the addition of the aforementioned chemical plasticizers to achieve the pliability necessary to function as a roofing membrane. Plasticizers are an artificial way to give PVC the flexibility that TPO has naturally with no chemical alteration.

This is a negative characteristic of PVC because plasticizers can break down. Plasticizers attract mold or microbes. The microbes eat the plasticizer and tend to attach themselves to the roof, thanks to the food supply. Not only are microbes unwelcome dinner guests, they turn the PVC roof a darker color and reduce the reflective quality that is so important to energy efficiency.

And since the plasticizers are required to make PVC flexible, the eventual loss of plasticizer results in a more brittle roof as the PVC reverts back to its original hard state. The roof can shrink and become more susceptible to hail damage and more difficult to heat weld while making repairs. This is a major difference between TPO which is naturally flexible.

Decisions on roofing systems are frequently made based on the specifications and physical characteristics of the roof. The question is how long will those physical characteristics last?

As the industry has matured, numerous studies and tests have been conducted to answer that question. One of the most recent and comprehensive studies of thermoplastic membranes, including TPO and PVC, was published in the May/June 2010 issue of RCI Interface Magazine.



TPO: Getting Better with Age

Testing was performed and reported by independent consulting firm, Jim D. Koontz & Associates in conjunction with Target Corporation, a national retailer that uses PVC roofing on its own facilities.

TPO was originally created to provide the advantages of PVC without the limitations at a better value with less environmental impact.

The consultant tested 11 single-ply membranes 5 TPO and 6 PVC from 7 different manufacturers. Testing was for long-term exposure to UV over 18 months. Results found that, "On average, the TPO membranes have a greater propensity for retaining physical properties when compared to PVC, KEE, and EV membranes."

The study provided evidence that TPO under similar conditions will outlast PVC. TPO was originally created to provide the advantages of PVC without the limitations at a better value with less environmental impact. It is hard to objectively argue that it has not achieved its goal with a significant savings of 10-20%. The long term return on investment should be even greater.

Laboratory testing is helpful and provides a scientific basis for comparison. Nonetheless, the market is the ultimate proving ground and it has made TPO the number one choice in the US for commercial roofing.

The RCI Interface Magazine report confirmed that not all TPOs are alike. As the RCI study indicated, there were substantial variations between the different manufacturers of TPO that were tested. So, how do you know which TPO to choose?

Selecting a manufacturer right for you requires homework. A good place to start is with these questions. How long has the manufacturer been making the membrane? The manufacturer should have a long-standing performance record. How often have they reformulated? Look for a manufacturer with a formula that has not required on-going experimentation to overcome shortfalls. Does the thickness over scrim meet ASTM requirements? ASTM requires 15 ml thickness over scrim. Does the company have a history of proven results? Can it demonstrate real world applications that are meeting expectations everyday, no matter what the conditions and in every environment?

There are other important common sense considerations, as well. Select a roof system from a manufacturer you have researched and are assured has the products, systems, and know-how to back them up. Research the warranties so you know what is covered and what is not. Check the fine print for temperature restrictions included and limitations on transferability. Look for limits on workmanship coverage.

Through its evolution manufacturers have learned how to make TPO. Performance and durability are the function of product design, material chemistry and manufacturing process. However, without proper installation the design, chemistry and manufacturing won't count for much. Be sure the manufacturer has licensed, trained, and experienced professional roofing contractors.

Has TPO grown up? The facts are clear. Take a hard look at TPO, you'll find a roofing product that truly has come of age.

By Michael Mendoza
TPO Product Manager, Firestone Building Products

Co-Author Hao Wang, Ph.D
Technical Director, Single-Ply Membranes, Firestone Building Products

Firestone
BUILDING PRODUCTS
NOBODY COVERS YOU BETTER.™