BUILDERS ASSOCIATION OF MINNESOTA
SERVING THE HOME BUILDING AND REMODELING INDUSTRY
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May 31, 2012

Commissioner Ken Peterson
Minnesota Department of Labor and Industry
443 Lafayette Road North
Saint Paul, MN 55155

Commissioner Peterson,

The 1309 Residential Code Advisory Committee met nine times from October 2011 through February 2012 and voted twice against requiring fire sprinklers in single-family homes. On December 14, 2011 the advisory committee vote was 10-2 and February 14, 2012 the vote was 8-4 against requiring fire sprinklers in single-family homes.

The December vote was in favor of IRC Proposal 87 (attached, Appendix A). The February vote was against fire service proposals offering a phase-in of mandatory sprinklers and tradeoffs such as an elimination of the interconnection of smoke alarms and basement escape windows within a house if sprinklers were installed (attached, Appendix B).

DLI distributed a Work Plan for the 1309 International Residential Code Committee, which directs committee members to:

> "Review each of the 2006 International Residential Code and 2012 International Residential Code for **new** provisions that may exceed the statutory charge of being "basic" and "uniform" and contributing to a state code that permits the construction of buildings "at the least possible cost consistent with recognized standards of health and safety."

To determine what public policy regarding fire sprinklers in new single-family homes best meets this standard three things must be considered and weighed carefully.

1) The cost of installing fire sprinklers.
2) The efficacy of existing fire safety requirements in the current building code (2007 Minnesota State Building Code based on the 2006 IRC).
3) The expected safety increases of installing sprinklers in all new single-family homes.

How Much Do Installed Fire Sprinkler Systems Cost?

To determine an actual cost for fire sprinklers in single-family homes the Builders Association of Minnesota asked home builders currently planning or building new home construction projects to request bids from fire sprinkler installers. We have received 7 site-specific sprinkler bids from 6 different home builders near Duluth, St. Cloud, the Twin Cities, Rochester and Willmar. Four of the homes are on well water and 3 are on municipal water supplies. (These bids and the floor plans of the home are attached in Appendix C.)

The fire sprinkler bids represent only the installed cost charged to the home builder. The actual homeowner cost would include builder overhead for serving as the general contractor and insuring the project. The home sizes ranged from 2,100 – 3,086 square feet plus the basement. The sprinkler bids ranged from $4,950 to $16,500 for each home. The sprinkler bids for the wells ranged from $12,100-$16,500. The municipal water supply bids ranged from $4,300 - $13,415. All bids were based on actual house plans and were submitted to home builders by reputable fire sprinkler or plumbing companies. All of the sprinkler bids, elevations and home plans are included in Appendix C for your review.

Summary of Fire Sprinkler Bids from Around Minnesota

Location	**County**	**Water Supply**	**Square Footage (without basement)**	**Sprinkler Installation Bid[#]** **[[#]Actual cost to home builder by installer. NOTE: Cost to homeowner will be higher because it will include builder markup]**
Byron	Olmsted	Private well	2,138	$12,600
Freedenberg Township	St. Louis	Private well	2460	$15,003[1]
Lake Andrew Township	Kandiyohi	Private well	3102	$16,500
Minneapolis	Hennepin	Municipal water	1,688	$4,950[2]
Minneapolis	Hennepin	Municipal water	1,688	$6,675[2]
Wayzata	Hennepin	Municipal water	3,086 (Slab-on-grade, no basement)	$13,415[3]
St. Augusta	Stearns	Private well	2,955	$12,100

[1]This bid also includes soffits in the vaulted ceiling.

[2]These bids were received by two different sprinkler installation companies for the same home on an infill lot in Minneapolis.

[3]This bid also includes insulated soffits in the attic.

The cost of these systems is well above the average $4,000 sprinkler installation cost estimated by the *Minnesota Fire Chiefs Association White Paper on Residential Sprinkler Systems*, even for the entry level 1,688 square foot house that will be connected to the Minneapolis municipal water supply. Costs to install NFPA 13D sprinkler systems on rural wells require pressure tanks and usually require a more powerful pump or in some cases with low water tables, an additional pump or second well. Currently 29% of all Minnesotans receive their water from private wells.

How Much Safety, At What Cost?

What if the fire sprinkler mandate had been enacted when the currently enforced 2007 Minnesota State Building Code was adopted? How many lives would be saved and at what cost to homeowners?

Zero lives saved at a cost of $168.5 million dollars to individual home owners.

Note: This conservative analysis assumes that for the 35,113 single family permits pulled from April 2007 through December 2010 per US Census data; 10 percent were built on rural wells at a cost of $12,000 each and the remaining 90 percent of homes cost $4,000 each. The $4,000 comes from the cost per home estimated by the *Minnesota Fire Chiefs Association's White Paper on Residential Sprinkler Systems*.

35,111 Permits Pulled For Single Family Homes in Minnesota (April 2007 – December 2010)

		Number of Houses	Fire Sprinkler Cost Per Home	Total Cost
Estimated % of Homes Built on Well Water	0.10	3,511	$12,000	$42,135,600
Estimated % of Homes with Municipal Water Supply	0.90	31,601	$4,000	$126,406,800
TOTAL COST OF FIRE SPRINKLERS IF MANDATED IN 2007				$168,542,400

Requiring homeowners to spend thousands of dollars on fire sprinklers in the most fire safe homes available is simply not sound public policy. The cost of a mandatory sprinkler system is too much when we know that even one working smoke alarm in a home provides a 99.45% chance of survival from a fire (statistic provided by the National Fire Protection Association). In many cases homeowners will be unable to afford a new home if this policy is implemented, meaning they will continue to live in older homes without hard wired, interconnected smoke alarms that are proven to save lives. Even worse; the extraordinary expense will drive homeowners to use unlicensed builders to circumvent the code requirements.

Respectfully,

Pamela Perri
Executive Vice President
Builders Association of Minnesota

cc: Senator Jeremy Miller
Senator John Pederson
Senator Ann Rest
Representative Mike LeMieur
Representative Tim Sanders

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ADVISORY COMMITTEE COMMENT FORM
FOR PROPOSED CODE CHANGES
(This form must be submitted electronically)

IRC-87, R313.2

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Proposed Code Change - Language

R313.2 ~~One- and t~~Two-family dwellings automatic fire systems.
An automatic residential fire sprinkler system shall be installed in ~~one- and~~ two-family *dwellings*.

Exception: An automatic residential fire sprinkler system shall not be required for *additions* or *alterations* to existing buildings that are not already provided with an automatic residential sprinkler system.

Proposed Code Change – Need and Reason

Sprinklers in New Single-Family Homes Won't Reduce the Residential Fire Death Rate

This code proposal is both needed and reasonable in Minnesota because the requirement of fire sprinkler systems in all new homes will be very costly to implement and is not likely to decrease the death rate from fires in single-family residences. A Minnesotan's level of safety depends on what decade their home was built. Since April 2003 the Minnesota State Building Code has required that all single-family homes have a smoke alarm on each level, in each bedroom, and within 10 feet of every bedroom. The Minnesota Building Code also requires all of these smoke alarms be hardwired and interconnected. The smoke alarms are hardwired directly to the electrical system and only rely on batteries in the case of a power outage. The smoke alarms are also interconnected meaning if any alarm detects smoke, they all go off simultaneously. This level of protection along with other mandatory fire prevention materials and methods required by the building code has been very effective in helping prevent residential fire deaths in Minnesota.

Section 313.2 of the 2012 IRC was added on the assumption that it would make new single-family homes safer by requiring fire sprinklers. However, this assumption ignored the housing stock where fire deaths occur and ignored the substantial increase in the cost of construction required to install sprinklers in custom homes, especially those with well water. Based on the number of Minnesota civilian fire deaths in single-family homes since the code requirement for hardwired, interconnected smoke detectors in 2003 was put in place; requiring fire sprinklers will be an added cost without an added safety benefit.

BAM bases this prediction on an analysis of the fire deaths that have occurred in Minnesota homes based on when those homes were built (Attachments A and B). Since 1998 the Minnesota Fire Marshalls Office has collected addresses and other data whenever a residential fire death occurs. BAM matched each address with county or municipal taxation or assessment records to determine when each home with a

fatal fire was originally built. Of the 229 fatal residential fires, 42 had incomplete addresses or no address. The remaining fire fatalities were divided into decades when they were constructed. The histogram labeled "1998-2010 Minnesota Civilian Fire Deaths in Single-Family Homes by Decade of Construction" (Attachment A) clearly shows that in homes built since the 1980's, when battery operated smoke alarms were required by code, fire death rates have fallen sharply. Compare the falling numbers of civilian fire deaths between single family homes built in the 1980's, 1990's and 2000's in Attachment A. The drop in death rates for these decades is a direct result of stricter code requirements and advances in smoke detector technology.

In the period from 2003-2010, when hardwired, interconnected smoke alarms were required, there was only one fire death in a single-family home (Attachment B). According to Minnesota State Fire Marshal data, that fire was caused by careless smoking in which the homeowner fell asleep on a couch with a lit cigarette. If fire sprinklers would have been required in 2003 would this homeowner have survived this house fire? Likely not. According to the Coalition for Fire-Safe Cigarettes, "if the cigarette falls near the head of a sleeping smoker, the smoldering fire can produce enough carbon monoxide to kill him or her before there is enough heat from the burning chair/bed to activate the sprinkler." In addition, fire sprinklers are also not likely to prevent fire deaths caused by people smoking while connected to oxygen.

Fatal Fires Occur in Older Homes

Fatal fires occur overwhelmingly in older homes. Fatal fires are much more likely to occur in homes without smoke alarms or homes without working smoke alarms. Code proposals or other fire prevention measures that are targeted at homes without smoke alarms or working smoke alarms would undoubtedly save lives. According to the National Fire Protection Association the chances of surviving a house fire with at least one working smoke alarm is 99.45%; and even higher with hardwired, interconnected alarms. Adding fire sprinklers as another level of safety to new single family homes (the most fire safe homes in the housing stock) will have no effect on the civilian fire deaths in houses without interconnected or hardwired smoke alarms.

An analogy for this type of public policy is to combat low elementary reading scores by providing the top 10% of each grade's students with a personal tutor. This would be an expensive way to do nothing to help struggling students learn to read. To achieve successful public policy results the correct population has to be targeted and requiring sprinklers in new single-family homes is simply the wrong target for reducing residential fire deaths.

Minnesota Fire Fighters Haven't Died Fighting Single-Family Fires

If fire sprinklers had been installed in every single-family home in Minnesota the firefighter fatality rate would still stand at 16 for the years 1989 – 2010.[1] This is because there has never been a Minnesota fire fighter killed in the line of duty fighting a residential fire dating back to 1989 when detailed records are available.[2,3] Firefighter fatalities have occurred in Minnesota because of vehicle strikes, vehicle accidents when traveling to a fire call or fire station, training accidents, commercial/industrial fires, and heart attacks before or after fire calls.[4]

Residential Fire Sprinklers Are Expensive

According to a report by the Minnesota Fire Chiefs Association the average Minnesota homeowner will pay $4,000 for a residential sprinkler system. (Attachment C, p. 6) However, actual estimates of installed systems are much more expensive. Rural homeowners with well water will pay the highest costs since these systems will require the addition of expansion tanks in a heated area of the house. Most rural homes

[1] U.S. Fire Administration's Firefighter Fatalities in the United States Annual Reports (1986-2010).
[2] Ibid.
[3] Minnesota Fallen Firefighters Memorial Association website, Line of Death Duty Report at http://www.mffma.org/memorial/MNFallenFireFighters.htm .
[4] Ibid, footnotes 1 and 3.

will also require a booster pump. In some areas of Minnesota there is a serious lack of ground water and some homeowners in these areas may require an additional well drilled. These costs may be justifiable if there were a proven need for this safety equipment in new single-family homes. An analysis of the type of housing where fire deaths occur does not justify adding a residential sprinkler requirement for new homes.

The cumulative effect of raising the cost of construction by a sprinkler mandate will be that 21,000-24,000 Minnesota families will be priced out of the market for a new home based on a study by the National Association of Home Builders (Attachment D). These homeowners are likely to currently live in homes that do not have hardwired, interconnected smoke alarms.

27 States Have Already Approved This Code Change

27 states around the country have already determined that section R313.2 is not a necessary requirement in their residential building codes. Minnesota's neighboring states are included in this list: Iowa, North Dakota, South Dakota and Wisconsin. It is reasonable to have a Minnesota specific amendment to delete one-family dwellings (single-family homes) from section R313.2. The requirement to install a fire sprinkler system in all one-family dwellings was first added to the 2009 International Residential Code which Minnesota did not adopt. Minnesota is the first state that is in the process of adopting the 2012 IRC. Of the 29 states that have considered adoption of the 2009 IRC national model code, all but two have deleted the requirement for requiring fire sprinklers in one-family dwellings. Maryland allows local municipalities to opt out of requiring fire sprinklers in their communities. Only the State of California has adopted the 2009 IRC with the sprinkler requirement statewide. The other 21 states have not adopted statewide building codes or have yet to adoption the 2009 or 2012 IRC.

Homeowners Can Still Choose to Install a Fire Sprinkler System

This proposed amendment would not prohibit ANY Minnesota homeowner from building a home with a residential sprinkler system. This code proposal would keep a homeowner's decision to install a sprinkler system a choice instead of a mandate. Most of BAM's members have never been asked by a homeowner or potential buyer to price out or install a fire sprinkler system. If a homeowner decides to have a fire sprinkler system installed in their single-family home, section R313.2.1 of the 2012 IRC requires the system be installed to the NFPA 13D standard. This proposal does not amend this section of the code.

Proposed Code Change – Cost/Benefit Analysis

Removing the mandate for a NFPA 13D fire sprinkler system in all homes will decrease the cost of construction by at least $4,000 for the average Minnesota homeowner based on a report by the Minnesota Fire Chief's Association (Attachment C, p. 6). According to the National Groundwater Association 29% of all Minnesota homeowners receive their water from private wells. Removing the mandate for a NFPA 13D fire sprinkler system for a Minnesota homeowner with well water will decrease the cost of construction by at least $6,000 for the average homeowner based on the cost of installing the sprinkler system, expansion tank and a booster pump.

Sprinkler proponents often cite an installation cost of $1.61 per square foot for installing a NFPA 13D fire system in a single-family home (Attachment C, p.3). This cost is far too low for Minnesota homes. Why?

(1) The National Fire Protection Association established this cost by gathering three bids for a single-family home model in 10 national cities (Attachment C, p. 3). The costs gathered for temperate climates do not apply to Minnesota homes because water pipes cannot be run in the attic without insulated soffits to protect them against freezing.

(2) Costs for townhomes are also not comparable to single-family sprinkler systems because custom house plans require a unique design.

(3) Sprinkler installation cost estimates for the 29% of rural homeowners on private wells require more equipment and some even require an additional well be drilled if ground water supply is scarce.

4) The actual installed home buyers cost of a sprinkler system on a municipal water supply in the City of Minnetonka is $5.78 per square foot, not $1.61 per square foot. In November 2010 Hans Hagen Homes, a Minnesota home builder requested a bid from three contractors for residential fire sprinklers for a 3,086 sq. ft. house in Minnetonka. The city was requiring the homeowner to install fire sprinklers as a trade off for a non-conforming lot variance. Only one, out of three of the sprinkler contractors provided a formal bid, the other two did not submit bids. The contractor quoted a price of $9,600 to install the sprinkler system but this did not include “soffits in attic for pipes to run in heated attic space as required” (Attachment E). The builders additional cost to incorporate, insulate & seal the soffits is estimated at $3,815. This brings the total hard cost to $13,415.

In addition to the hard costs, a homeowner can expect to pay an additional $4,426 in soft costs. Which include marketing, commission, design, field overhead, G&A expense, financing, closing costs, and builder profit (Attachment F). The total installed cost to the homeowner is $17,841 or $5.78 per square foot. The homeowner can expect an annual expense of $1,120 in increased real estate taxes, mortgage interest and a $50 yearly maintenance fee (Attachment F).

(5) BAM was unable to obtain a single bid for a fire sprinkler system installed on a private well since none of our members have been asked by homeowners to price out or install this type of system.

Other Factors to Consider Related to Proposed Code Change

1. Is this proposed code change meant to:

   ☒ change language contained in a published code book? If so, list section(s).
   2012 International Residential Code, Section R313.2

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in a published code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ neither; this language will be new language, not found in the code book or in Minnesota Rule.

2. Is this proposed code change required by a Minnesota Statute or new legislation? If so, please provide the citation to the Statute or legislation.
   No

3. Will this proposed code change impact other sections of a published code book or of an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   No

4. Will this proposed code change impact other parts of the Minnesota State Building Code? If so, please list the affected parts of the Minnesota State Building Code.
   No

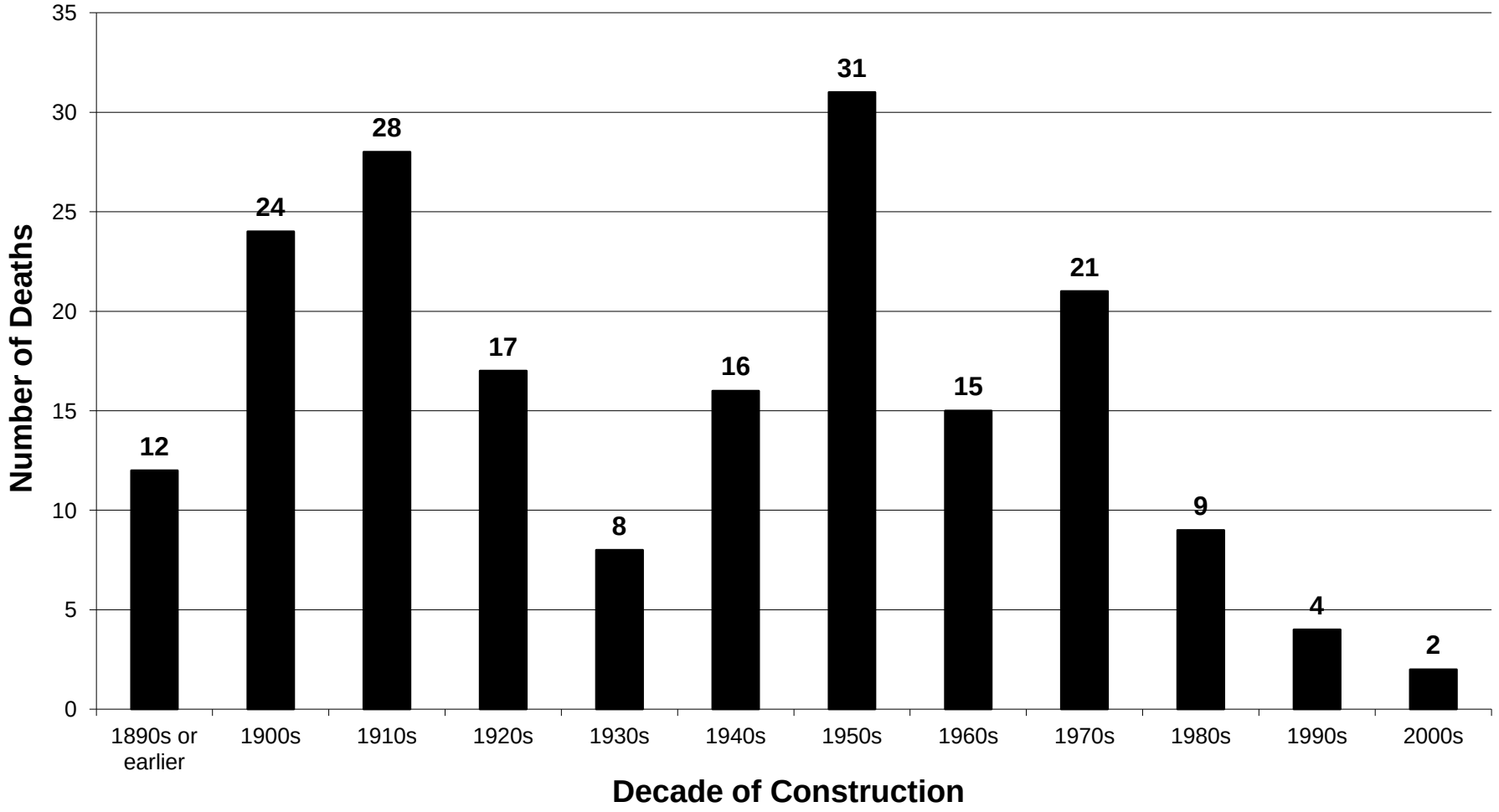
5. Who are the parties affected or segments of industry affected by this proposed code change?
   Future homeowners, home builders, building code officials

6. Can you think of other means or methods to achieve the purpose of the proposed code change? If so, please explain what they are and why your proposed change is the preferred method or means to achieve the desired result.
   No

7. Are you aware of any federal requirement or regulation related to this proposed code change? If so, please list the regulation or requirement.
   No

ATTACHMENT A

1998-2010 Minnesota Civilian Fire Deaths in Single Family Homes by Decade of Construction (187 total*)



[*BAM was unable to determine year of construction for 38 SF homes (and 42 additional deaths) due to insufficient addresses from State Fire Marshal data. see 2nd page for details]. Data do not include fire deaths caused by explosions, arson/homocide or suicide in single family homes; or those in mobile homes , duplexes, multi-family, apartments, commercial, and other residential uses such as motels, hotels, and nursing homes.

Builders Association of Minnesota

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UNKNOWN YEAR OF CONSTRUCTION FOR SINGLE FAMILY HOMES WHERE 42 CIVILIAN FIRE DEATHS OCCURRED 1998 – 2010

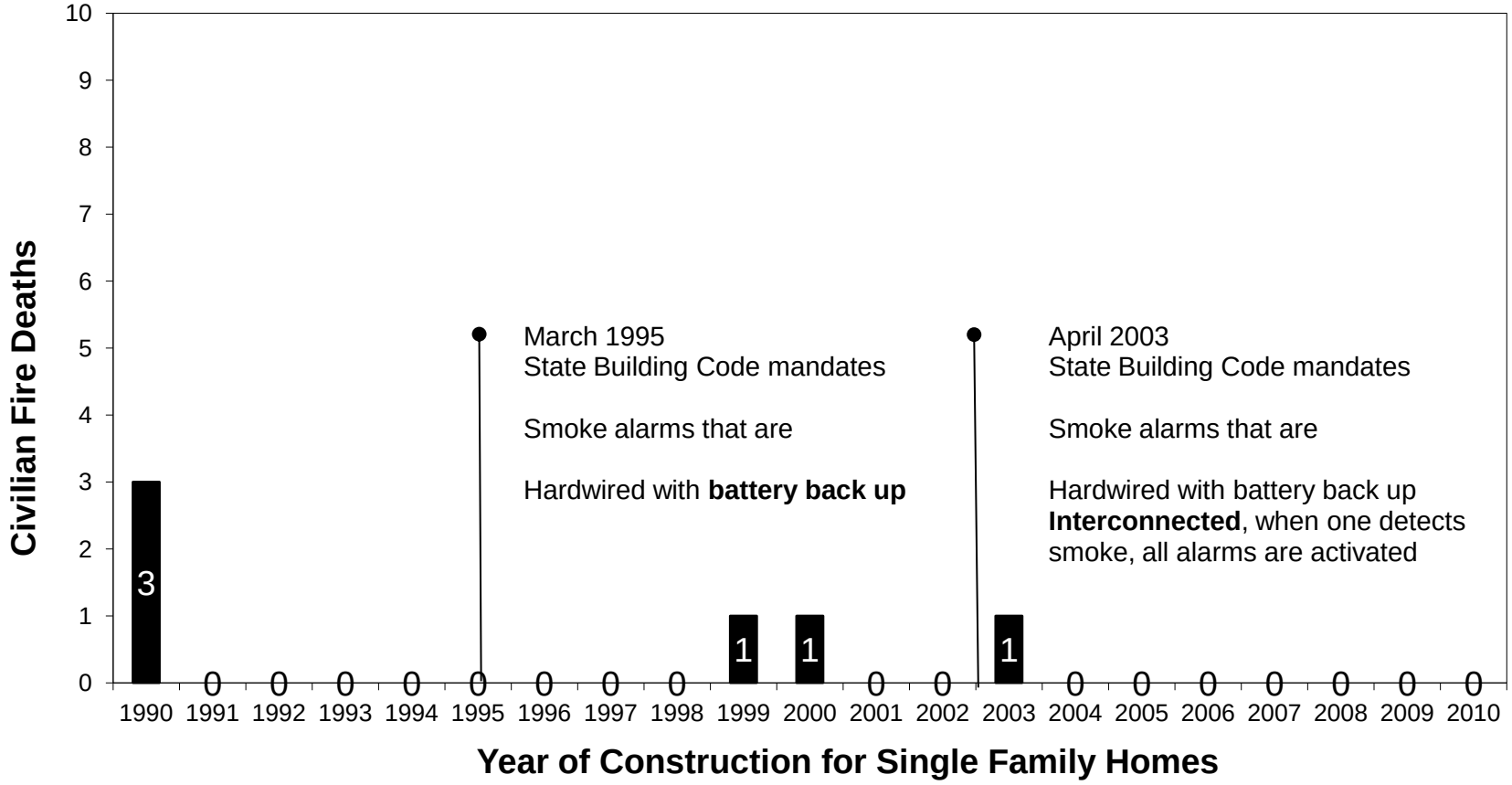
*Data from Minnesota Fire Marshal

** Unable to establish if structure was a mobile home, single family detached home or duplex

*Date of Fire	*Address	*Location	Status researched by BAM staff	*Civilian Deaths
3/4/1998	1141 S Eagle Drive	BAXTER	NO LISTING AT CO/CITY	1
3/8/1998	CO RD 57 (now Driftwood St)	MCGREGOR	INCOMPLETE ADDRESS	1
7/28/1998	P O BOX 36 PONEMAH	PONEMAH (DIST.)	INCOMPLETE ADDRESS	1
9/4/1998	Bad Medicine Lake	PONSFORD	NO ADDRESS	1
9/9/1998	8625 EAST RIVER RD	COON RAPIDS	NO LISTING AT CO/CITY	1
1/7/1999	RT 2 BOX 48	GLYNDON	INCOMPLETE ADDRESS	2
1/21/1999	RR 1, BOX 158 ZUMBRO	ZUMBRO FALLS	INCOMPLETE ADDRESS	1
1/30/1999	RR 3	ELLENDALE	INCOMPLETE ADDRESS	1
4/9/1999		BLUE EARTH	NO ADDRESS	1
4/13/1999		WINDOM	NO ADDRESS	1
10/19/1999	215 BOUNDARY ST/HY220	ALVARADO	NO LISTING AT COUNTY	2
10/30/1999	RR 1,BX86,DAKOTA,MN	DAKOTA	INCOMPLETE ADDRESS	1
12/13/1999	rt.1	PINE CITY	INCOMPLETE ADDRESS	1
4/16/2000	3655 E CO RD 10	CHASKA	NO LISTING AT CO/CITY	1
10/12/2000	RR 2,BX 211 C,CASS LK	CASS LAKE	INCOMPLETE ADDRESS	1
1/1/2001	RR	SHEVLIN	INCOMPLETE ADDRESS	2
1/8/2001	403 3RD ST,AITKIN,MN	AITKIN	NO LISTING AT COUNTY	2
2/14/2001	Rt 2	RED LAKE FALLS	INCOMPLETE ADDRESS	1
5/8/2001	HC3 Box 155A	MAHNOMEN	INCOMPLETE ADDRESS	1
4/17/2002	511 E Main Street	LE ROY	NO LISTING AT CO/CITY	1
5/5/2002	RR 2,BX 142,TRACY,MN	TRACY	INCOMPLETE ADDRESS	1
8/18/2002	9747 HWY 101	SAVAGE	NO LISTING AT CO/CITY	1
9/19/2002		GRANADA	NO ADDRESS	1
9/19/2002	865 Main St	LINO LAKES	NO HISTORICAL DATA AT COUNTY OR CITY	1
11/5/2002		ELIZABETH	NO ADDRESS	2
12/8/2002	10151 Lynwood blvd	MOUND	NO LISTING AT CO/CITY	1
12/14/2002		DETROIT LAKES	NO ADDRESS	1
5/13/2003	CTY ROAD 2	MADISON LAKE	INCOMPLETE ADDRESS	1
12/21/2003		LITTLE FALLS	NO ADDRESS	1
11/23/2004	808 6TH ST SW,IRONTON	IRONTON	NO LISTING AT CO/CITY	1
2/18/2006**	4177 TOWN RD 98,LOMAN	LOMAN	NO LISTING AT COUNTY	1
2/26/2006**		STARBUCK	NO ADDRESS	1
10/6/2006**	BAGLEY,MN	BAGLEY	NO ADDRESS	1
7/27/2007**	P O BOX 408 REDBY	REDBY (DIST.)	INCOMPLETE ADDRESS	1
5/24/2008**	13536 N HORSESHOE LK RD	CROSS LAKE (MISSION TWSP)	NO LISTING AT CO/CITY	1
4/17/2009**	19552 420th	MCGREGOR	NO LISTING AT CO/CITY	1
5/7/2009	288 91ST ST	BEAVER CREEK	NO LISTING AT CO	1

ATTACHMENT B

Civilian Fire Fatalities in 431,000+ Single-Family Homes Built between 1990 - 2010 and Housing Over 1,086,000# Minnesotans



+Based on U.S. Census number of single amily home permits issued in Minnesota from 1990-2010.

#Based on Minnesota State Demographic Center 's estimate of the average number of persons per household.

Builders Association of Minnesota

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ATTACHMENT C

Minnesota State Fire Chiefs Association

White Paper on Residential Sprinkler Systems

Background:
At the September, 2008 International Code Council hearings conducted in Minneapolis, Minnesota, a proposal to require residential fire sprinklers for one and two family homes was approved (see below) for homes built under the 2009 version of the International Residential Code (IRC).

SECTION R313
FIRE SPRINKLER SYSTEMS

R313.1 General. Effective January 1, 2011, an approved automatic fire sprinkler system shall be installed in new one-and two-family dwellings and townhouses in accordance with NFPA 13D.

The IRC is a model code that each state, or in some cases, local jurisdictions, can adopt as their model building code. Minnesota has historically adopted the International Building Code, International Fire Code, and the International Residential Code on a state-wide basis and there is currently no effort underway to change this.

The Department of Labor and Industry (DOLI) is tasked with adoption of the model codes and has issued a letter on June 1, 2009 stating the adoption of all codes; Building, Fire and Residential would be temporarily placed on hold due to the combination of economic conditions and lack of any significant changes in any of the model codes.

The letter states DOLI's intention of beginning the adoption process with the formation of advisory committees to begin sometime in 2010 or at the latest, the early part of 2011.

Effective Date:
The IRC provision calls for an effective date of no sooner than January 1, 2011. If the state adopts the IRC by January 1 the provision will apply. If adoption occurs after January 1, 2011 then only those homes built after adoption will be required to comply. There is no retroactive provision in the code.

NFPA 13D:
The National Fire Protection Association is a non-profit 100+ year old organization specializing in fire related issues. Amongst their many activities are the development of education materials, standards, and codes. The "13" series of their product line are specific to automatic sprinkler systems with the NFPA 13[1] standard for

[1] National Fire Protection Association, *Standard for the Installation of Sprinkler Systems*

ATTACHMENT C

commercial applications, 13R[2] applicable to multi-family structures such as apartments and town homes, and the 13D[3] applicable to one and two family residences.

NFPA 13D standard is the least prescriptive, thus, the most economical. The following table illustrates some of the differences:

Item	**13 System**	**13D System**
Pipe	Steel Pipe 1" to 8" diameter	Plastic typically 1" diameter
Coverage	100% of building	Small closets, bathrooms, storage areas exempted if under 55 sq. ft.
Pressure Test	Required	Not Required
Fire Department Connection	Required	Not Required
Alarm	Required	Not Required

There are numerous myths and inaccurate statements about the requirements of 13D, many of these surround water supply and electrical power. The facts are 13D is a performance standard in which the installer must calculate flow requirements based upon the water supply. Your certified system designer will obtain water supply information and calculate supply needs and possible pump requirements based upon the structure.

FACT – 13D has no requirement for a water reservoir or pump unless the water supply is inadequate. In most municipal cases the water supply should be adequate; however, in rural areas with wells, a slightly larger pump (1/4 to 1/3 more horsepower) will adequately supply a single family system. New sprinkler head technology specific for13D systems allow operation at flows as low as 8 gallons per minute. NFPA requires a minimum supply of at least two heads, thus 16 gallons per minute. For comparison, a 5/8" garden hose flows at 17 gallons per minute.

FACT – 13D has no requirement for back-up electrical power of the pump. If there is a power failure at the same time a fire occurs there is a greater likelihood of significant fire damage.

[2] National Fire Protection Association, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*

[3] National Fire Protection Association, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*

ATTACHMENT C

Cost:
A recent report issued by the Fire Protection Research Foundation[4] which is comprised of fire groups, home builders, and water supply agencies details the cost to install a NFPA 13D compliant system ranges from $.38 per square foot to $3.66 per square foot. The average cost was $1.61 per square foot. The Report determined this number by selecting ten representative cities from around the nation and soliciting and acquiring three bids.

Minnesota, with its cold winter climate eliminates certain efficiencies in installation as few circumstances allow any pipe in the attic area. Cities such as Blaine, Plymouth and Maple Grove have thousands of systems installed in town homes and close to a hundred one and two single family homes.

Their experience reflects the Minnesota Fire Chiefs member's average of $1.61 for the townhomes and approximately $1.80 for one and two single family homes.

Reductions/Insurance Savings/Financing Costs:
Depending upon the community, there may be certain trade-off or alternatives to other building code requirements if sprinklers are installed. These are more typical for town homes where street width can be narrowed, lot size reduces, and hydrant spacing increased. However, these same trade-offs can and have been used in single family housing developments.

Additionally, most community building and fire officials will accept a sprinkler system as an alternate to egress windows from basement locations. Depending upon your situation, the installation of a sprinkler system would partially or wholly offset the cost of egress window installation.

At least thirteen insurance companies now provide a discount on their homeowner policy ranging from 5% to 15%. While this is becoming more widely known, the consumer still must shop on the open market to achieve the greatest savings[5].

If one were to finance a $3,500 system (average cost for a 2,000 sq. ft. home); at a 6.5% interest rate the additionally monthly cost in your mortgage would be just under $5 per month.

Operation:
All sprinkler heads including residential sprinkler heads are activated by heat. Meaning that only those heads closest to the fire will activate. Most residential heads are designed to activate at 155 degrees. In close to 90% of fires in which a sprinkler head activates, a single head will control or extinguish the fire[6].

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[4] Fire Protection Research Foundation, *Home Fire Sprinkler Cost Assessment*, 2008, http://www.nfpa.org/assets/files//PDF/Research/FireSprinklerCostAssessment.pdf
[5] Insurance Services Office, Inc., *Residential Sprinklers ISO Fact Sheet*, www.isomitigation.com
[6] NFPA, *Fast Facts About Home Fire Sprinklers*

ATTACHMENT C

Accidental discharge of sprinkler heads is rare. Factory Mutual, a nationally recognized testing laboratory reports the chance of an accidental discharge from a sprinkler is "the odds that rival winning the California State Lottery." Water filled sprinkler heads and pipes are subject to freezing, however, no more or less than your domestic water supply. No evidence or data exists indicating more water damage due to frozen sprinkler pipes versus frozen water pipes.

Water damage from sprinklers is minimal given that one to two sprinklers typically control the fire. This equate to 15 to 20 gallons per minute. Comparatively, upon arrival the fire department will employ a minimum of two firefighting lines discharging 150 to 200 gallons per minute each or a total of 300 to 400 gallons of water per minute.

Unlike most other systems in your home; lawn sprinklers, heating and cooling and plumbing; there is virtually no maintenance for residential systems. A periodic check of the pressure gauge and ensuring the main valve is never turned off is typically all that is required.

In their 100+ year history, sprinklers have proven to be extremely effective in controlling and extinguishing fire. There are few other examples of technologies more effective in minimizing death and destruction as sprinklers.

Comparatively, traditional fire suppression is the least effective method of controlling fire and the United States, despite having some of the best training, equipment, and technology, ranks amongst the worst when compared to the world in fire property and death statistics.

Fire Facts:
According to the United States Fire Administration for the calendar year 2007;

- There were 399,000 structure fires in the United States
- 2,865 civilians were killed, a disproportionate number of them young children and elderly people.
- There were 13,600 civilian injuries.
- Over $7.4 billion worth of property was destroyed.
- Over 100 firefighters were killed.
- According to a National Institute of Standards and Technology study, a family had 17 minutes to escape a residential fire in the 1970's[7]. Today, due to changes in construction, finishing materials, and the large amount of synthetics and plastics in the contents of the home, that time has been reduced to as few as 3 minutes[8]!

[7] NIST, *Technical Note 1455*
[8] NIST, *Technical Note 1455*

ATTACHMENT C

Policy Issues:
Communities can significantly reduce their overall fire protection costs through the adoption and use of codes requiring the use of automatic sprinkler systems. A community using this approach transfers the responsibility directly to the property owner who receives the benefits of reduced insurance costs, a vastly improved response in the event of a fire, significantly reduced loss of personal property, and reduced infrastructure costs (taxes). In communities where sprinklers are an integral part of the overall fire protection plan, it is possible to save millions of dollars per year of property tax dollars via the use of a combination, volunteer, or smaller career department. Minnesota cities such as Bloomington, Plymouth, Woodbury Eden Prairie, and Maple Grove are just a few of many examples of cities who have been able to maintain predominantly volunteer departments at significant cost savings in large part due to sprinkler requirements.

Lightweight construction, specifically the dominate use of trusses and floor trusses are emerging as a firefighters greatest threat. First introduced about twenty years ago, they are almost exclusively used in all new home construction. Any fire that penetrates and impinges on the truss assembly almost immediately weakens the assembly and has resulted in a greater frequency of firefighter injuries and fatalities as they have fallen through the floor.

Numerous scientific studies have been completed on this issue with two of the more recent ones being; National Institute of Standards and Technology in January of 2007 and Uderwriters Laboratories in conjunction with Michigan State University in November of 2008. Both studies reported results of significant failure of the truss assembly when exposed to fire, sometimes within minutes of the fire starting[9].

Opponents argue that smoke detectors are more than sufficient to protect a family in a residential occupancy. However, statistics again reveal that while smoke detectors have a marvelous record in having helped to reduce the number of deaths over the years, they simply are not adequate or effective in all cases. Disabled, disconnected and poorly maintained detectors are present in over 25% of residential structures. Furthermore, as mentioned earlier, the young and old are especially vulnerable and given the speed at which fire grows, smoke detector activation has proven to be inadequate.

Finally, the Insurance Services Office (ISO) just released a Residential Sprinkler ISO Fact Sheet stating:

- Premium credit of 13% for fully sprinklered homes and 8% for partial
- Leakage coverage is included in the basic policy, there is no extra charge.
- If the requirement of the International Residential Code (2009) for automatic sprinkler protection is removed by legislative or local ordinance the ISO Building Code Effectiveness Grading Schedule would not provide full recognition for adoption of the code.

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[9] NIST, *A Study of Metal Truss Plate Connectors When Exposed to Fire*
UL, *Fire Test Report: Wood Truss Members with Steel Plate Connectors Used in Floor-Ceiling Assemblies*

ATTACHMENT C

Summary:
Installing residential sprinklers in newly constructed one and two family homes will have a profound impact on the fire service, local governments, and society.

An average homeowner will pay less than $4,000 for the installation of the system and will, in most cases, recoup that investment through the combination of insurance savings, possible construction trade offs, and reduced property taxes.

The same homeowner will enjoy an immeasurably greater level of safety, with respect to fire, as compared to reliance on traditional fire suppression response which has proven time and time again to be woefully inadequate due to the speed at which fire grows.

ATTACHMENT D

Minnesota Households Priced Out of the Market by an Increase in House Prices

Area	Mortgage Rate	House Price	Monthly Mortgage Payment	Taxes and Insurance	Minimum Income Needed	Households That Can Afford House
Minnesota	4.50%	$171,000	$821	$220	$44,640	1,292,724
Minnesota	4.50%	$175,000	$841	$225	$45,685	1,271,701
Difference		$4,000	$19	$5	$1,044	-21,023
Minnesota	4.50%	$171,000	$821	$220	$44,640	1,292,724
Minnesota	4.50%	$175,580	$843	$226	$45,836	1,268,653
Difference		$4,580	$22	$6	$1,196	-24,071

Calculations assume a 10% down payment and a 45 basis point fee for private mortgage insurance.
A Household Qualifies for a Mortgage if Mortgage Payments, Taxes, and Insurance are 28% of Income

Minnesota Household Income Distribution for 2012				
Income Range:			Households	Cumulative
$0	to	$10,469	123,858	123,858
$10,470	to	$15,705	107,585	231,443
$15,706	to	$20,940	107,051	338,494
$20,941	to	$26,175	105,573	444,066
$26,176	to	$31,410	103,124	547,191
$31,411	to	$36,645	108,311	655,502
$36,646	to	$41,881	99,387	754,888
$41,882	to	$47,116	105,399	860,287
$47,117	to	$52,351	86,973	947,260
$52,352	to	$62,821	178,713	1,125,973
$62,822	to	$78,527	236,263	1,362,236
$78,528	to	$104,703	291,268	1,653,504
$104,704	to	$130,879	181,371	1,834,875
$130,880	to	$157,055	98,177	1,933,052
$157,056	to	$209,407	93,760	2,026,812
$209,408	to	More	76,346	2,103,158

Analysis conducted by the National Association of Home Builders based on a sprinkler increasing the cost of construction by of a single-family home by $4,000 when connected to a municipal water supply and $4,580 when connected to a private well.

National Association of Home Builders, based on data from the 2007 American Community Survey, U.S. Census Bureau.

ATTACHMENT E

LIFESAVER FIRE PROTECTION

Sprinkler Installation & Service • Est. 1991

Proposal

PRESENTED BY SEAN SABERY
MAIN 763-473-9010
FAX 763-475-9076
CELL 612-990-7930
PO BOX 583533 MINNEAPOLIS, MN 55458

PRESENTED TO:	DATE:
Jon Peterson Hans Hagen Homes	11-3-10
PHONE: FAX: CELL: 763-586-7200	JOB NAME:
ADDRESS: 941 N.E. Hillwind Rd. Suite 300 Fridley, MN 55432	JOB LOCATION:

Dear John,

We appreciate the opportunity to work with you on this project! Lifesaver Fire Protection proposes the following work based on the information that was provided:

Scope:
Installation of new sprinkler system per City of Wayzata regulations, NFPA 7, 2002 & NFPA 20, 2007 guidelines, and the State of Minnesota.

Per plans dated 9-25-07
(1) Wet-Type System
Builder to supply soffits in attic for pipes to run in heated attic space as required
Concealed Heads

Design, Engineering and Permits:
Lifesaver Fire Protection shall complete working drawings per NFPA guidelines prior to fabrication of materials and submit plans for permitting. All applicable permit fees have been included.

Price:
The budget price for the above-specified work including general consulting, design, engineered drawings, submittals to state, permit fees, materials, and labor is $9,600.

Proposal Date: November 3, 2010
By:

_____ and

Lifesaver Fire Protection
This proposal will remain in effect for 20 days.

Accepted this Day
By:

_____

Name **Title**

ATTACHMENT F

Homeowner Cost Analysis
Fire Sprinkler System Cost

Based on fire sprinkler installation bid (ATTACHMENT E)
and home builder's hard and soft costs (shown below)
for a 3,086 square foot single-family home on a municipal water supply

Hard Cost			
Direct Cost from Vendor		$	9,600.00
Soffit Attic (360 lf @ $8.25)		$	2,970.00
Soffit Insulation (Celotex Sealed)		$	800.00
Foam Penetrations		$	45.00
Total Hard Cost		**$**	**13,415.00**
Soft Cost			
Marketing Expense	3%	$	402.45
Commission	6%	$	804.90
Design - Bid -Plans	1.25%	$	167.69
Field Overhead	8%	$	1,073.20
G & A Expense	3.25%	$	435.99
Financing	2.75%	$	368.91
Homeowner Closing Cost	2.25%	$	301.84
Builder Profit	6.50%	$	871.98
Total Soft Cost		**$**	**4,426.95**
Homeowner Total Direct Cost		**$**	**17,841.95**
Homeowner Additional Cost			
Annual Real Estate Taxes	1.25%	$	223.02
Interest on 95% Mortgage	5%	$	847.49
Repair and Maintenance		$	50.00
Homeowner Annual Cost		**$**	**1,120.52**

443 Lafayette Road N.
St. Paul, Minnesota 55155
www.dli.mn.gov

MINNESOTA DEPARTMENT OF LABOR & INDUSTRY

(651) 284-5005
1-800-DIAL-DLI
TTY: (651) 297-4198

ADVISORY COMMITTEE COMMENT FORM
FOR PROPOSED CODE CHANGES
(This form must be submitted electronically)

IRC-136, R310.1

Author/requestor: Tom Brace

Email address: trbrace@comcast.com

Telephone number: 651-603-8827

Firm/Association affiliation, if any: FMAM / MSFCA

Proposed Code Change - Language

SECTION R310
EMERGENCY ESCAPE AND RESCUE OPENINGS

R310.1 Emergency escape and rescue required. *Basements*, habitable attics and every sleeping room shall have at least one operable emergency escape and rescue opening. Where *basements* contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room. Where emergency escape and rescue openings are provided they shall have a sill height of not more 44 inches (1118 mm) measured from the finished floor to the bottom of the clear opening. Where a door opening having a threshold below the adjacent ground elevation serves as an emergency escape and rescue opening and is provided with a bulkhead enclosure, the bulkhead enclosure shall comply with section R310.3. The net clear opening dimensions required by this code shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. Emergency escape and rescue openings with a finished sill height below the adjacent ground elevation shall be provided with a window well in accordance with Section R310.2. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way.

Exception 1: Basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet (18.58 m2).

Exception 2: Dwellings provided with an automatic fire sprinkler system complying with the requirements of section R313.

(Sections R310.1 1, R310.1.2, R310.1.3 R310.1.4, R310.2, R310.2.1, R310.2.2, R310.3, R310.4 & R310.5 to remain as written)

Proposed Code Change – Need and Reason

At the December 14, 2011 IRC Hearing the Minnesota Fire Chiefs Association (MSFCA) and Fire Marshal's Association (FMAM) provided the MN 1309 International Residential Code Committee with twenty scientific based research reports detailing a number of issues related to residential fire sprinklers. Those reports have been entered into the record and are summarized below.

Opponents of the code change continue to advocate for removal of the provision from the model code despite overwhelming evidence that sprinklers work, smoke detectors do not, and follow these arguments with exaggerated cost estimates. Of primary focus is their myopic argument that no deaths have occurred (according to their research) in homes built with interconnected smoke detectors. We believe this data analysis to be false, but more importantly, fails to recognize numerous other issues of equal and/or greater importance.

Cost/Benefit of Sprinklers:

1. Traditional fire suppression has proven to be inefficient, extremely costly, and extremely dangerous. Sprinkler requirements in commercial, industrial, educational and multi-family properties have substantially reduced the devastating impacts of fire specific to fatalities, injuries and property loss. While it will be a measure of time before the full benefit of residential sprinklers are realized, the traditional model of fire suppression is not sustainable. Sprinklers are the solution as the cost offsets including insurance and property tax savings will pay for every system and several times that over the life of the home.
2. Property taxes will be impacted favorably as departments can maintain volunteer/paid-on-call or more efficient career departments. Quantifying the amount is difficult to do, however, using Minnesota as an example and data from the Minnesota Taxpayers Association we rank 44th to 47th in per capita and per $1,000 income for fire protection as compared to the other 50 states. This is a function of our volunteer pension system which encourages longevity AND a strong building and fire code with many of the metropolitan communities adopting 1306 and other code provisions dating back to the early 1980's. For comparison, we see departments in the Twin City metro region with annual operating budgets of $750,000 to $2,000,000 protecting populations of 20,000 to 90,000 with volunteer/paid-on-call or duty crew models. Other cities of similar population across the nation have budgets two to three times this amount.
3. Fatalities of residents are clearly important and a justifiable criteria for sustaining the sprinkler provision in the code. However, of equal concern is that of responder safety. The fire service seldom knows if a home is occupied and must always assume it is, absent irrevocable proof. Thus, a fire in a residence will result in a fire department responding from which, at the moment in time that the alarm is sounded, risks escalate for both responders and citizens as evidenced by the number of fire, police, and ambulance crashes. Those risks continue in terms of both injury and fatality throughout the mitigation of the hazard (s) but also days and even years past the event as evidenced by the numerous studies of cardiac disease, respiratory disease, and cancer rates, all of which are disproportionately higher for emergency responders as compared to the rest of society.

In summary, the issue is far greater than homeowner deaths; rather, it is the combination of costs, risks, injuries and deaths. Sprinklers have proven themselves in all other occupancies (educational, industrial, commercial, assembly and multi-family) both the life safety side of the equation and also the fiscal side of the equation as proven by the tens of thousands of occupancies that have been constructed with sprinklers and are in operation today.

Additionally, sprinklers have been installed in thousands of twin homes, quad homes and condo's throughout the Twin Cities over the past decade or two with no apparent negative impact on builders' ability to "sell" their product as evidenced by the record number of units constructed.

MSFCA and FMAM recognize the need to address cost impacts in conjunction with the proven effectiveness of sprinklers. Simply put, sprinklers are so effective that traditional construction requirements are simply not needed given the undisputable effectiveness of sprinklers. To that end, we submit the changes as outlined above, which become redundant and therefore add cost to the construction of the home if the passive requirements are not removed from the code.

Reports

1. ***Smoke Alarms in U. S Home Fires***

   September, 2011
   National Fire Protection Association
   Almost all households in the U.S. have at least one smoke alarm, yet in 2005-2009, smoke alarms were present in less than three-quarters (72%) of all reported home fires and operated in half (51%) of the reported home fires. ("Homes" includes one- and two-family homes, apartments, and manufactured housing.) More than one-third (38%) of all home fire deaths resulted from fires in homes with no smoke alarms, while one-quarter (24%) resulted from fires in homes in which smoke alarms were present but did not operate. The death rate per 100 reported fires was twice as high in homes without a working smoke alarm as it was in home fires with this protection. Hardwired smoke alarms are more reliable than those powered solely by batteries.

2. ***Performance of Home Smoke Alarms Analysis of the Response of Several Available***

   Technologies in Residential Fire Settings
   February 2008
   National Institute of Standards and Technology
   This report presents the results of the project and provides details of the response of a range of residential smoke alarm technologies in a controlled laboratory test and in a series of real-scale tests conducted in two different residential structures. The data developed in this study include measurement of temperature and smoke obscuration in addition to gas concentrations for a range of fire scenarios and residences. The results are intended to provide both insight into siting and response characteristics of residential smoke alarms and a set of reference data for future enhancements to alarm technology based on fires from current materials and constructions. Smoke alarms of either the ionization type or the photoelectric type consistently provide time for occupants to escape from most residential fires, although in some cases the escape time provided can be short. Consistent with prior findings, ionization type alarms provide somewhat better response to flaming fires than photoelectric alarms, and photoelectric alarms provide (often) considerably faster response to smoldering fires than ionization type alarms. Escape times in this study were systematically shorter than those found in a similar study conducted in the 1970's. This is related to some combination of faster fire development times for today's products that provide the main fuel sources for fires, such as upholstered furniture and mattresses, different criteria for time to untenable conditions, and improved understanding of the speed and range of threats to tenability.

3. ***U.S. Firefighter Injuries 2010***

   2010
   National Fire Protection Association
   NFPA estimates that 71,875 firefighter injuries occurred in the line of duty in 2010. An estimated 32,675 or two-fifths (45.4%) of the all firefighter injuries occurred during fireground operations. An estimated 14,190 occurred during other on duty activities, while 13,355 occurred at nonfire emergency incidents. The leading type of injury received during fireground operations was strain, sprain or muscular pain (52.8%), followed by wound, cut, bleeding, and bruises (14.2%). Regionally, the Northeast had the highest fireground injury rate.

4. ***The Economic Consequences of Firefighter Injuries and Their Prevention. Final Report***

   August 2004
   National Institute of Standards and Technology

Based on methods applied from two of the more relevant economic studies, the estimated cost of addressing firefighter injuries and of efforts to prevent them is $2.8 to $7.8 billion per year. The cost elements that comprised those two studies were based on workers compensation payments and other insured medical expenses, including long-term care; lost productivity; administrative costs of insurance; and others. Other costs heretofore have not been factored into assessments of firefighter injuries. The study team analyzed such elements as the labor costs of investigating injuries, along with the hours required for data collection, report writing, and filing. Another cost relates to what employers of firefighters pay to provide insurance coverage, and for safety training, physical fitness programs, and protective gear and equipment—all of these expenses are related to preventing injuries and reducing their severity. The study researchers were fortunate to obtain workers compensation information that was specific to the occupational codes for firefighters, a unique feature of this new research. Some of these expenses were applied to the total number of injuries, while others were factored around the total number of firefighters since they involve all firefighters, not just those who are injured. Estimates of these cost components alone accounted for $830 to $980 million in direct and indirect costs.

5. Total Cost of Fire in the United States

2011

National Fire Protection Association

The total cost of fire in the United States, as it is defined, is a combination of the losses caused by fire and the money spent on fire prevention, protection and mitigation to prevent worse losses, by preventing them, containing them, detecting them quickly, and suppressing them effectively. For 2008, that total cost is estimated at $362 billion, or roughly 2.5% of U.S. gross domestic product. Economic loss (property damage) – reported or unreported, direct or indirect represents only $20.1 billion of this total. The net costs of insurance coverage ($15.2 billion), the cost of career fire departments ($39.7 billion), new building costs for fire protection ($62.7 billion), other economic costs ($44.0 billion), the monetary value of donated time from volunteer firefighters ($138 billion), and the estimated monetary equivalent for the civilian and firefighter deaths and injuries due to fire ($42.4 billion), all are larger components than property loss.

6. Third Needs Assessment of the U.S. Fire Service

June, 2011

National Fire Protection Association

Fire service needs are extensive across the board, and in nearly every area of need, the smaller the community protected, the greater the need. Fire service needs have declined to a considerable degree in a number of areas, particularly personal protective and firefighting equipment, and two types of resources that received the largest shares of funding from the Assistance to Firefighters grants (AFG). Declines in needs have been more modest in some other important areas, such as training, which have received much smaller shares of AFG grant funds. In all areas emphasized by the AFG and SAFER grants, there is ample evidence of impact from the grants but also considerable residual need still to be addressed, even for needs that have seen considerable need reduction in the past decade.

There has been little change in the ability of departments, using only local resources, to handle certain types of unusually challenging incidents, including two types of homeland security scenarios (structural collapse and chem/bio agent attack) and two types of large-scale emergency responses (a wildland/urban interface fire and a developing major flood). However, the surveys have indicated improvement in the development of written agreements to help in the use of outside resources. This may provide the strongest base on which to build, namely, the creation of regional and national agreements to allow costs of shared resources to be shared across a much wider area while also providing a protocol for any community to respond to an unusually challenging incident that is very unlikely within the community but not so unlikely within the entire region.

7. Fire Performance of Houses. Phase I. Study of Unprotected Floor Assemblies in Basement Fire Scenarios.

December, 2008
Institute for Research in Construction
Details high fire hazards of lightweight truss construction in residential construction and the increased threat to occupants as well as firefighters.

8. Report on Structural Stability of Engineered Lumber in Fire Conditions

September, 2008
Underwriters Laboratory
This report describes the fire resistive performance of nine assemblies tested as part of a fire research and education grant sponsored by the Fire Prevention and Safety Grants under the direction of the Department of Home Security/Federal Emergency Management Agency/Assistance to Firefighters Grants.

9. Report on Structural Stability of Engineered Lumber in Fire Conditions

January, 2009
Underwriters Laboratory
This report describes the fire resistive performance of three assemblies tested as part of a fire research and education program in cooperation with The City of Chicago Fire Department.

***10.* The Performance of Composite Wood Joists under Realistic Fire Conditions**

2008
Tyco
The results from this test series demonstrate that exposed, lightweight composite wood joists are likely to fail three to five minutes after compartment flashover for structures with typical residential loadings. Further, the time to collapse as measured from the start of flaming combustion for the fire scenarios employed in this test series was between 8 and 12 minutes. This relatively small timeframe prior to the failure of exposed composite wood joists may require the fire service to adopt alternative tactics and procedures for structures built using lightweight construction methods. This test program further highlights the dramatic differences between the sprinklered and un-sprinklered scenarios, as demonstrated through photographs, observations and data collected. All of the information presented shows that the addition of a sprinkler system can greatly enhance life safety of both residents and firefighters and aid in property protection. Today's homes contain more products with higher heat release rates than in previous years and the construction of these homes has become less fire resistant due to the use of lightweight construction materials. This combination has proven to be deadly for firefighters.

11. A Study of Metal Truss Plate Connectors when Exposed to Fire

January 2007
National Institute of Standards and Technology
The popularity of lightweight, metal plate connected wood truss construction is increasing due to cost effectiveness, versatility, and ease of construction. This type of construction brings many concerns to the firefighting community, since structural collapse has caused numerous injuries and fatalities in the fire service. In an attempt to determine the performance of metal plate wood truss connections during fire exposures, NIST conducted a series of twelve instrumented tests exposing one side of the test specimen to the thermal exposure. Load carrying ability of the metal plate truss connections was not measured during these tests. The tests were purely an attempt to study the heat transfer between the metal plate and the wood. Results from these tests suggest that the metal plates help to protect the wood beneath the plates. However, additional work is required to produce more detailed information.

12. Preventing Injuries and Deaths of Firefighters due to Truss Failure Systems

April 2005
National Institute for Occupational Safety and Health
Report provides details on in which firefighter deaths were due in some part to lightweight truss construction, the dangers of lightweight trusses in fire conditions, and need to make changes.

13. U.S. Experience with Sprinklers and Other Automatic Fire Extinguishing Equipment.

January 2009
Dr. John Hall, National Fire Protection Association
Automatic sprinklers are highly effective elements of total system designs for fire protection in buildings. They save lives and property, producing large reductions in the number of deaths per thousand fires, in average direct property damage per fire, and especially in the likelihood of a fire with large loss of life or large property loss. When sprinklers are present in the fire area, they operate in 93% of all reported structure fires large enough to activate sprinklers, excluding buildings under construction. When they operate, they are effective 97% of the time, resulting in a combined performance of operating effectively in 91% of reported fires where sprinklers were present in the fire area and fire was large enough to activate sprinklers. In homes (including apartments), wet-pipe sprinklers operated effectively 96% of the time. When wet-pipe sprinklers are present in structures that are not under construction and excluding cases of failure or ineffectiveness because of a lack of sprinklers in the fire area, the fire death rate per 1,000 reported structure fires is lower by 83% for home fires, where most structure fire deaths occur, and the rate of property damage per reported structure fire is lower by 40-70% for most property uses. In homes (including apartments), wet-pipe sprinklers were associated with a 74% lower average loss per fire. Also, when sprinklers are present in structures that are not under construction and excluding cases of failure or ineffectiveness because of a lack of sprinklers in the fire area, 95% of reported structure fires have flame damage confined to the room of origin compared to 74% when no automatic extinguishing equipment is present. When sprinklers fail to operate, the reason most often given (53% of failures) is shutoff of the system before fire began. (All statistics are based on 2003-2007 fires reported to U.S. fire departments, excluding buildings under construction.)

14. U.S. Experience with Sprinklers

May, 2011

National Fire Sprinkler Association

Automatic sprinklers are highly effective elements of total system designs for fire protection in buildings. They save lives and property, producing large reductions in the number of deaths per thousand fires, in average direct property damage per fire, and especially in the likelihood of a fire with large loss of life or large property loss. In 2009, 4.6% of occupied homes (including multi-unit) had sprinklers, up from 3.9% in 2007, and 18.5% of occupied homes built in the previous four years had sprinklers. When sprinklers are present in the fire area, they operate in 91% of all reported non-confined structure fires large enough to activate sprinklers, excluding buildings under construction. When they operate, they are effective 96% of the time, resulting in a combined performance of operating effectively in 87% of reported non-confined fires where sprinklers were present in the fire area and fire was large enough to activate sprinklers. In homes (including multi-unit), wet-pipe sprinklers operated effectively 92% of the time. When wet-pipe sprinklers are present in homes that are not under construction and excluding cases of failure or ineffectiveness because of a lack of sprinklers in the fire area, the fire death rate per 1,000 reported structure fires is lower by 83%, and the rate of property damage per reported home structure fire is lower by 71%. When sprinklers fail to operate, the reason most often given (65% of failures) is shutoff of the system before fire began.

15. Home Fire Sprinkler Cost Assessment

September, 2008

Fire Protection Research Foundation
Comprehensive cost analysis of residential sprinkler system installation cost in U. S. at $1.61 per square foot as the national average. Assessment was conducted under oversight committee comprised of Fire, Home, Insurance and other interested stakeholders.

16. Benefit - Cost Analysis of Residential Sprinkler Systems

September 2007
National Institute of Standards and Technology
This report documents a benefit-cost analysis performed to measure the expected present value of net benefits resulting from the installation of a multipurpose network fire sprinkler system in a newly-constructed, single-family house. The benefits and costs associated with the installation and use of a fire sprinkler system are compared across three prototypical single-family housing types: colonial, townhouse, and ranch. The installation costs differ by housing types, with the colonial being the most expensive and the ranch the least. The benefits experienced by residents of single-family dwellings with sprinkler systems, as measured in this report, include reductions in the following: the risk of civilian fatalities and injuries, homeowner insurance premiums, uninsured direct property losses, and uninsured indirect costs. The primary costs examined are for initial purchase and installation of the sprinkler system. Maintenance and repair costs are not examined because they are negligible.
Results of the benefit-cost analysis show that multipurpose network sprinkler systems are economical. The expected present value of net benefits (PVNB) in 2005 dollars is estimated as $2919 for the colonial-style house, $3099 for the townhouse, and $4166 for the ranch-style house. A sensitivity analysis is performed to measure the variability of the results to changes in the modeling assumptions. The sensitivity analysis confirms the robustness of the baseline analysis. The PVNB ranges from $704 to $4801 for the colonial-style house, from $884 to $4981 for the townhouse, and from $1950 to $6048 for the ranch-style house. Multipurpose network systems are the lowest life-cycle cost systems because homeowners can perform their own regular inspections and maintenance, and thereby save on costs they would incur with other systems. Given that they provide a similar level of performance, in terms of fire-risk mitigation, multipurpose network systems then achieve greater cost-effectiveness over alternate systems.

17. Residential Sprinklers and Housing Economics. A legislators guide to Life Safety

February 2009
Buddy DeWar
Independent analyst who debunks numerous myths about fiscal impact specific to residential fire sprinklers complete with validated data.

18. International Residential Code and Fire Sprinklers

November 2009
Minnesota Governor's Council on Fire Protection
Residential fire sprinklers were introduced in the 1970's for use in single- and two-family homes, but have never been required for installation by the model building codes in the United States on a nationwide basis. Recent action by the International Code Council has moved the requirement for the installation of these sprinklers in new single- and two-family homes into the most widely adopted of the model codes and brought the possibility of adoption to the state of Minnesota. This document provides an overview of information on residential fire sprinklers.

***19.* United States Fire Administration Position on Residential Fire Sprinklers**

March, 2008
Federal Emergency Management Agency

20. **National Fire Protection Agency Comments on IRC Proposals**

In addition to these reports we submit the following article and report into the record:

1. **The Crusader – National Fire Protection Association Journal**
   For years, Canadian homebuilder Murray Pound rejected home fire sprinklers based on notions of exorbitant cost and installation hassles. Now he's an outspoken sprinkler advocate on a mission to dispel the myths. What changed?
2. **Communities with Home Fire Sprinklers. The Experience in Bucks County, Pennsylvania November 2011**
   http://homefiresprinkler.org/images/stories/pdfs/BucksCountyReport.pdf

   Fire sprinkler systems have been saving lives, preventing injuries and limiting property loss since the mid-1800s. Initially used in manufacturing and commercial structures, over time the technology's unique protective qualities were extended to other occupancies, including residential structures. This is fortunate; homes have for decades been where the vast majority of structural fire deaths occur and that fact remains true today. In 2011, the National Fire Protection Association's (NFPA) 2010 fire loss survey showed that home fires accounted for 85%of all civilian fire deaths. Fire sprinklers are uniquely suited to protecting occupants of homes. Most fatal home fires occur at night, when people are typically sleeping. Working smoke alarms provide an early warning that can alert or awaken occupants so they can deploy their escape plan. However, smoke alarms can only detect and signal a fire; they do nothing to control it. Survival is dependent upon the occupants' willingness and ability to quickly and appropriately respond (normally, to escape). When a fire occurs in a home with a fire sprinkler system, the heat from that fire quickly activates the sprinkler closest to the fire (not the entire system). That action controls the fire while it is still small, and in many cases extinguishes it. Controlling a fire in this incipient stage limits the spread of deadly heat and smoke, and prevents flashover (the point at which everything in the room ignites). Sprinklers give occupants a safe window of opportunity to escape the fire. This added time is especially valuable for the more vulnerable populations – young children, older adults, and people with disabilities that limit their mobility.
   This report looks at home fire sprinkler installation in six municipalities in Bucks County, Pennsylvania. These municipalities were selected because sprinkler installation was required in those jurisdictions at varying times over several decades. That widespread use provided our researchers with a unique picture of home fire sprinkler installation and the opportunity to compare that experience with homes in the same municipalities that do not have sprinklers installed. The six municipalities include Buckingham Township, Ivyland Borough, New Britain Township, Warrington Township, Warwick Township and Wrightstown Township. Each is located in the central portion of the County, and has undergone significant growth since the 1980s. The jurisdictions range from rural to suburban, with and without public water service.
   This report focuses on the life safety advantages of installing home fire sprinkler systems, primarily the prevention of civilian fire deaths. Some attention is also given to the additional benefits of the technology, including injury prevention (civilian and firefighter), reduced tax rates and lower capital expenditures for community fire protection. Because most discussions about installing fire sprinkler systems in new homes include a debate about added costs, our report also investigated this aspect and reviewed the impact the systems have had on development in the six communities. Our study illustrates many ways in which home fire sprinkler system installations have become an important part of the community fire protection plan for these jurisdictions. Most importantly, we recount the documented "life saves" that resulted when fires occurred in sprinklered homes.

   Overall, there were 90 fire deaths in un-sprinklered one- and two-family dwellings in Bucks County from 1988-2010 (88%of all County fire deaths during that time frame), with no fire deaths occurring in sprinklered dwellings. Five fire incidents in sprinklered homes have been documented as saving at least five lives.
   The average property loss in the sprinklered home fire incidents was $14,000, with an average of 340 gallons of water used to extinguish the fires. These incidents can be compared to 51 fires in un-sprinklered homes in the six studied municipalities from 2005-2010, in which the average fire loss per incident was $179,896 and for those fires where water usage data was available, an average of 5,974 gallons (nearly 25 tons) of water was needed to extinguish the fires.

Proposed Code Change – Cost/Benefit Analysis

The proposed changes will decrease costs of construction from the current IRC requirements.

The phase-in process allows both the building industry and sprinkler industry time to adjust to the requirements and develop cost efficiencies. It is difficult and subject to quantify this amount; however, based on sound economic principles of market forces it is reasonable to conclude that significant savings will occur.

Trade-off savings will be substantial and vary based on site specific facts. Egress window installation ranges from $600 to $1,000 each. Under-floor protection costs range from $.50 cents a square foot to $1.10 per square foot. Fire blocking, draft stopping, penetrations protection costs vary with the home and construction types.

Insurance premium savings, based on an average metro homeowner's policy of $845, is between 5% and 12% per year or $42 and $101 per year. Over the course of 20 years the insurance savings equate to $840 to $2,020. This average is based on 2008 data from the Insurance Federation of Minnesota and is for the entire State. Predictably, the IRC will have greater consequence in the Metro area given that more new homes will likely be constructed there. Similarly, home values and thus, insurance coverage and policy premiums will be higher in the metro area than the State average resulting in greater savings to the metro homeowner via their insurance coverage.

For those interested in reforming government and reducing costs; sprinklers are the perfect solution as the recipient is the investor who realizes their return via the combination of insurance savings, trade-offs reduced property taxes and the confidence and comfort of knowing the level of protection provided by sprinklers is unequalled.

The combination of construction trade-offs and insurance savings over time will exceed the installation costs.

For those homes constructed as part of new developments, the additional cost reductions related to street construction and hydrant spacing (per the MN State Fire Code) will either result in further cost reductions to the homeowner or increased profitability for the developer/builder. Finally, when adding the reduced property taxes, the homeowner realizes further fiscal benefit.

In closing, the "Crusader" article and Bucks County Report provides additional evidence and proof that residential fire sprinklers are cost effective.

Other Factors to Consider Related to Proposed Code Change

1. Is this proposed code change meant to:

   x change language contained in a published code book? If so, list section(s).
   R310.1

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in a published code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   neither; this language will be new language, not found in the code book or in Minnesota Rule.

2. Is this proposed code change required by a Minnesota Statute or new legislation? If so, please provide the citation to the Statute or legislation.
   No

3. Will this proposed code change impact other sections of a published code book or of an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   No

4. Will this proposed code change impact other parts of the Minnesota State Building Code? If so, please list the affected parts of the Minnesota State Building Code.
   No

5. Who are the parties affected or segments of industry affected by this proposed code change?
   Homeowners, Firefighters, Code Officials, Builders

6. Can you think of other means or methods to achieve the purpose of the proposed code change? If so, please explain what they are and why your proposed change is the preferred method or means to achieve the desired result.
   No

7. Are you aware of any federal requirement or regulation related to this proposed code change? If so, please list the regulation or requirement.
   No

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ADVISORY COMMITTEE COMMENT FORM
FOR PROPOSED CODE CHANGES
(This form must be submitted electronically)

IRC-137, R314.5

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Firm/Association affiliation, if any: FMAM / MSFCA

Proposed Code Change - Language

SECTION R314
SMOKE ALARMS

R314.5 Interconnection. Where more than one smoke alarm is required to be installed within an individual dwelling unit in accordance with Section R314.3, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit. Physical interconnection shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.

Exception 1: Interconnection of smoke alarms in existing areas shall not be required where alterations or repairs do not result in removal of interior wall or ceiling finishes exposing the structure, unless there is attic, crawl space or basement available which could provide access for interconnection without the removal of interior finishes.

Exception 2: Dwellings provided with an automatic fire sprinkler system complying with the requirements of section R313.

Proposed Code Change – Need and Reason

At the December 14, 2011 IRC Hearing the Minnesota Fire Chiefs Association (MSFCA) and Fire Marshal's Association (FMAM) provided the MN 1309 International Residential Code Committee with twenty scientific based research reports detailing a number of issues related to residential fire sprinklers. Those reports have been entered into the record and are summarized below.

Opponents of the code change continue to advocate for removal of the provision from the model code despite overwhelming evidence that sprinklers work, smoke detectors do not, and follow these arguments with exaggerated cost estimates. Of primary focus is their myopic argument that no deaths have occurred (according to their research) in homes built with interconnected smoke detectors. We believe this data analysis to be false, but more importantly, fails to recognize numerous other issues of equal and/or greater importance.

Cost/Benefit of Sprinklers:

1. Traditional fire suppression has proven to be inefficient, extremely costly, and extremely dangerous. Sprinkler requirements in commercial, industrial, educational and multi-family properties have substantially reduced the devastating impacts of fire specific to fatalities, injuries and property loss. While it will be a measure of time before the full benefit of residential sprinklers are realized, the traditional model of fire suppression is not sustainable. Sprinklers are the solution as the cost offsets including insurance and property tax savings will pay for every system and several times that over the life of the home.
2. Property taxes will be impacted favorably as departments can maintain volunteer/paid-on-call or more efficient career departments. Quantifying the amount is difficult to do, however, using Minnesota as an example and data from the Minnesota Taxpayers Association we rank 44th to 47th in per capita and per $1,000 income for fire protection as compared to the other 50 states. This is a function of our volunteer pension system which encourages longevity AND a strong building and fire code with many of the metropolitan communities adopting 1306 and other code provisions dating back to the early 1980's. For comparison, we see departments in the Twin City metro region with annual operating budgets of $750,000 to $2,000,000 protecting populations of 20,000 to 90,000 with volunteer/paid-on-call or duty crew models. Other cities of similar population across the nation have budgets two to three times this amount.
3. Fatalities of residents are clearly important and a justifiable criteria for sustaining the sprinkler provision in the code. However, of equal concern is that of responder safety. The fire service seldom knows if a home is occupied and must always assume it is, absent irrevocable proof. Thus, a fire in a residence will result in a fire department responding from which, at the moment in time that the alarm is sounded, risks escalate for both responders and citizens as evidenced by the number of fire, police, and ambulance crashes. Those risks continue in terms of both injury and fatality throughout the mitigation of the hazard (s) but also days and even years past the event as evidenced by the numerous studies of cardiac disease, respiratory disease, and cancer rates, all of which are disproportionately higher for emergency responders as compared to the rest of society.

In summary, the issue is far greater than homeowner deaths; rather, it is the combination of costs, risks, injuries and deaths. Sprinklers have proven themselves in all other occupancies (educational, industrial, commercial, assembly and multi-family) both the life safety side of the equation and also the fiscal side of the equation as proven by the tens of thousands of occupancies that have been constructed with sprinklers and are in operation today.

Additionally, sprinklers have been installed in thousands of twin homes, quad homes and condo's throughout the Twin Cities over the past decade or two with no apparent negative impact on builders' ability to "sell" their product as evidenced by the record number of units constructed.

MSFCA and FMAM recognize the need to address cost impacts in conjunction with the proven effectiveness of sprinklers. Simply put, sprinklers are so effective that traditional construction requirements are simply not needed given the undisputable effectiveness of sprinklers. To that end, we submit the changes as outlined above, which become redundant and therefore add cost to the construction of the home if the passive requirements are not removed from the code.

Reports

1. ***Smoke Alarms in U. S Home Fires***

   September, 2011
   National Fire Protection Association

Almost all households in the U.S. have at least one smoke alarm, yet in 2005-2009, smoke alarms were present in less than three-quarters (72%) of all reported home fires and operated in half (51%) of the reported home fires. ("Homes" includes one- and two-family homes, apartments, and manufactured housing.) More than one-third (38%) of all home fire deaths resulted from fires in homes with no smoke alarms, while one-quarter (24%) resulted from fires in homes in which smoke alarms were present but did not operate. The death rate per 100 reported fires was twice as high in homes without a working smoke alarm as it was in home fires with this protection. Hardwired smoke alarms are more reliable than those powered solely by batteries.

2. Performance of Home Smoke Alarms Analysis of the Response of Several Available

Technologies in Residential Fire Settings
February 2008
National Institute of Standards and Technology
This report presents the results of the project and provides details of the response of a range of residential smoke alarm technologies in a controlled laboratory test and in a series of real-scale tests conducted in two different residential structures. The data developed in this study include measurement of temperature and smoke obscuration in addition to gas concentrations for a range of fire scenarios and residences. The results are intended to provide both insight into siting and response characteristics of residential smoke alarms and a set of reference data for future enhancements to alarm technology based on fires from current materials and constructions. Smoke alarms of either the ionization type or the photoelectric type consistently provide time for occupants to escape from most residential fires, although in some cases the escape time provided can be short. Consistent with prior findings, ionization type alarms provide somewhat better response to flaming fires than photoelectric alarms, and photoelectric alarms provide (often) considerably faster response to smoldering fires than ionization type alarms. Escape times in this study were systematically shorter than those found in a similar study conducted in the 1970's. This is related to some combination of faster fire development times for today's products that provide the main fuel sources for fires, such as upholstered furniture and mattresses, different criteria for time to untenable conditions, and improved understanding of the speed and range of threats to tenability.

3. U.S. Firefighter Injuries 2010

2010
National Fire Protection Association
NFPA estimates that 71,875 firefighter injuries occurred in the line of duty in 2010. An estimated 32,675 or two-fifths (45.4%) of the all firefighter injuries occurred during fireground operations. An estimated 14,190 occurred during other on duty activities, while 13,355 occurred at nonfire emergency incidents. The leading type of injury received during fireground operations was strain, sprain or muscular pain (52.8%), followed by wound, cut, bleeding, and bruises (14.2%). Regionally, the Northeast had the highest fireground injury rate.

4. The Economic Consequences of Firefighter Injuries and Their Prevention. Final Report

August 2004
National Institute of Standards and Technology
Based on methods applied from two of the more relevant economic studies, the estimated cost of addressing firefighter injuries and of efforts to prevent them is $2.8 to $7.8 billion per year. The cost elements that comprised those two studies were based on workers compensation payments and other insured medical expenses, including long-term care; lost productivity; administrative costs of insurance; and others. Other costs heretofore have not been factored into assessments of firefighter injuries. The study team analyzed such elements as the labor costs of investigating injuries, along with the hours required for data collection, report writing, and filing. Another cost relates to what employers of firefighters pay to

provide insurance coverage, and for safety training, physical fitness programs, and protective gear and equipment—all of these expenses are related to preventing injuries and reducing their severity. The study researchers were fortunate to obtain workers compensation information that was specific to the occupational codes for firefighters, a unique feature of this new research. Some of these expenses were applied to the total number of injuries, while others were factored around the total number of firefighters since they involve all firefighters, not just those who are injured. Estimates of these cost components alone accounted for $830 to $980 million in direct and indirect costs.

5. Total Cost of Fire in the United States

2011

National Fire Protection Association

The total cost of fire in the United States, as it is defined, is a combination of the losses caused by fire and the money spent on fire prevention, protection and mitigation to prevent worse losses, by preventing them, containing them, detecting them quickly, and suppressing them effectively. For 2008, that total cost is estimated at $362 billion, or roughly 2.5% of U.S. gross domestic product. Economic loss (property damage) – reported or unreported, direct or indirect represents only $20.1 billion of this total. The net costs of insurance coverage ($15.2 billion), the cost of career fire departments ($39.7 billion), new building costs for fire protection ($62.7 billion), other economic costs ($44.0 billion), the monetary value of donated time from volunteer firefighters ($138 billion), and the estimated monetary equivalent for the civilian and firefighter deaths and injuries due to fire ($42.4 billion), all are larger components than property loss.

6. Third Needs Assessment of the U.S. Fire Service

June, 2011

National Fire Protection Association

Fire service needs are extensive across the board, and in nearly every area of need, the smaller the community protected, the greater the need. Fire service needs have declined to a considerable degree in a number of areas, particularly personal protective and firefighting equipment, and two types of resources that received the largest shares of funding from the Assistance to Firefighters grants (AFG). Declines in needs have been more modest in some other important areas, such as training, which have received much smaller shares of AFG grant funds. In all areas emphasized by the AFG and SAFER grants, there is ample evidence of impact from the grants but also considerable residual need still to be addressed, even for needs that have seen considerable need reduction in the past decade.

There has been little change in the ability of departments, using only local resources, to handle certain types of unusually challenging incidents, including two types of homeland security scenarios (structural collapse and chem/bio agent attack) and two types of large-scale emergency responses (a wildland/urban interface fire and a developing major flood). However, the surveys have indicated improvement in the development of written agreements to help in the use of outside resources. This may provide the strongest base on which to build, namely, the creation of regional and national agreements to allow costs of shared resources to be shared across a much wider area while also providing a protocol for any community to respond to an unusually challenging incident that is very unlikely within the community but not so unlikely within the entire region.

7. Fire Performance of Houses. Phase I. Study of Unprotected Floor Assemblies in Basement Fire Scenarios.

December, 2008

Institute for Research in Construction

Details high fire hazards of lightweight truss construction in residential construction and the increased threat to occupants as well as firefighters.

8. Report on Structural Stability of Engineered Lumber in Fire Conditions

September, 2008
Underwriters Laboratory
This report describes the fire resistive performance of nine assemblies tested as part of a fire research and education grant sponsored by the Fire Prevention and Safety Grants under the direction of the Department of Home Security/Federal Emergency Management Agency/Assistance to Firefighters Grants.

9. ***Report on Structural Stability of Engineered Lumber in Fire Conditions***

January, 2009
Underwriters Laboratory
This report describes the fire resistive performance of three assemblies tested as part of a fire research and education program in cooperation with The City of Chicago Fire Department.

10. **The Performance of Composite Wood Joists under Realistic Fire Conditions**

2008
Tyco
The results from this test series demonstrate that exposed, lightweight composite wood joists are likely to fail three to five minutes after compartment flashover for structures with typical residential loadings. Further, the time to collapse as measured from the start of flaming combustion for the fire scenarios employed in this test series was between 8 and 12 minutes. This relatively small timeframe prior to the failure of exposed composite wood joists may require the fire service to adopt alternative tactics and procedures for structures built using lightweight construction methods. This test program further highlights the dramatic differences between the sprinklered and un-sprinklered scenarios, as demonstrated through photographs, observations and data collected. All of the information presented shows that the addition of a sprinkler system can greatly enhance life safety of both residents and firefighters and aid in property protection. Today's homes contain more products with higher heat release rates than in previous years and the construction of these homes has become less fire resistant due to the use of lightweight construction materials. This combination has proven to be deadly for firefighters.

11. ***A Study of Metal Truss Plate Connectors when Exposed to Fire***

January 2007
National Institute of Standards and Technology
The popularity of lightweight, metal plate connected wood truss construction is increasing due to cost effectiveness, versatility, and ease of construction. This type of construction brings many concerns to the firefighting community, since structural collapse has caused numerous injuries and fatalities in the fire service. In an attempt to determine the performance of metal plate wood truss connections during fire exposures, NIST conducted a series of twelve instrumented tests exposing one side of the test specimen to the thermal exposure. Load carrying ability of the metal plate truss connections was not measured during these tests. The tests were purely an attempt to study the heat transfer between the metal plate and the wood. Results from these tests suggest that the metal plates help to protect the wood beneath the plates. However, additional work is required to produce more detailed information.

12. ***Preventing Injuries and Deaths of Firefighters due to Truss Failure Systems***

April 2005
National Institute for Occupational Safety and Health
Report provides details on in which firefighter deaths were due in some part to lightweight truss construction, the dangers of lightweight trusses in fire conditions, and need to make changes.

13. ***U.S. Experience with Sprinklers and Other Automatic Fire Extinguishing Equipment.***

January 2009
Dr. John Hall, National Fire Protection Association
Automatic sprinklers are highly effective elements of total system designs for fire protection in buildings. They save lives and property, producing large reductions in the number of deaths per thousand fires, in average direct property damage per fire, and especially in the likelihood of a fire with large loss of life or large property loss. When sprinklers are present in the fire area, they operate in 93% of all reported structure fires large enough to activate sprinklers, excluding buildings under construction. When they operate, they are effective 97% of the time, resulting in a combined performance of operating effectively in 91% of reported fires where sprinklers were present in the fire area and fire was large enough to activate sprinklers. In homes (including apartments), wet-pipe sprinklers operated effectively 96% of the time. When wet-pipe sprinklers are present in structures that are not under construction and excluding cases of failure or ineffectiveness because of a lack of sprinklers in the fire area, the fire death rate per 1,000 reported structure fires is lower by 83% for home fires, where most structure fire deaths occur, and the rate of property damage per reported structure fire is lower by 40-70% for most property uses. In homes (including apartments), wet-pipe sprinklers were associated with a 74% lower average loss per fire. Also, when sprinklers are present in structures that are not under construction and excluding cases of failure or ineffectiveness because of a lack of sprinklers in the fire area, 95% of reported structure fires have flame damage confined to the room of origin compared to 74% when no automatic extinguishing equipment is present. When sprinklers fail to operate, the reason most often given (53% of failures) is shutoff of the system before fire began. (All statistics are based on 2003-2007 fires reported to U.S. fire departments, excluding buildings under construction.)

14. U.S. Experience with Sprinklers

May, 2011

National Fire Sprinkler Association

Automatic sprinklers are highly effective elements of total system designs for fire protection in buildings. They save lives and property, producing large reductions in the number of deaths per thousand fires, in average direct property damage per fire, and especially in the likelihood of a fire with large loss of life or large property loss. In 2009, 4.6% of occupied homes (including multi-unit) had sprinklers, up from 3.9% in 2007, and 18.5% of occupied homes built in the previous four years had sprinklers. When sprinklers are present in the fire area, they operate in 91% of all reported non-confined structure fires large enough to activate sprinklers, excluding buildings under construction. When they operate, they are effective 96% of the time, resulting in a combined performance of operating effectively in 87% of reported non-confined fires where sprinklers were present in the fire area and fire was large enough to activate sprinklers. In homes (including multi-unit), wet-pipe sprinklers operated effectively 92% of the time. When wet-pipe sprinklers are present in homes that are not under construction and excluding cases of failure or ineffectiveness because of a lack of sprinklers in the fire area, the fire death rate per 1,000 reported structure fires is lower by 83%, and the rate of property damage per reported home structure fire is lower by 71%. When sprinklers fail to operate, the reason most often given (65% of failures) is shutoff of the system before fire began.

15. Home Fire Sprinkler Cost Assessment

September, 2008
Fire Protection Research Foundation
Comprehensive cost analysis of residential sprinkler system installation cost in U. S. at $1.61 per square foot as the national average. Assessment was conducted under oversight committee comprised of Fire, Home, Insurance and other interested stakeholders.

16. Benefit - Cost Analysis of Residential Sprinkler Systems

September 2007
National Institute of Standards and Technology
This report documents a benefit-cost analysis performed to measure the expected present value of net benefits resulting from the installation of a multipurpose network fire sprinkler system in a newly-constructed, single-family house. The benefits and costs associated with the installation and use of a fire sprinkler system are compared across three prototypical single-family housing types: colonial, townhouse, and ranch. The installation costs differ by housing types, with the colonial being the most expensive and the ranch the least. The benefits experienced by residents of single-family dwellings with sprinkler systems, as measured in this report, include reductions in the following: the risk of civilian fatalities and injuries, homeowner insurance premiums, uninsured direct property losses, and uninsured indirect costs. The primary costs examined are for initial purchase and installation of the sprinkler system. Maintenance and repair costs are not examined because they are negligible.
Results of the benefit-cost analysis show that multipurpose network sprinkler systems are economical. The expected present value of net benefits (PVNB) in 2005 dollars is estimated as $2919 for the colonial-style house, $3099 for the townhouse, and $4166 for the ranch-style house. A sensitivity analysis is performed to measure the variability of the results to changes in the modeling assumptions. The sensitivity analysis confirms the robustness of the baseline analysis. The PVNB ranges from $704 to $4801 for the colonial-style house, from $884 to $4981 for the townhouse, and from $1950 to $6048 for the ranch-style house. Multipurpose network systems are the lowest life-cycle cost systems because homeowners can perform their own regular inspections and maintenance, and thereby save on costs they would incur with other systems. Given that they provide a similar level of performance, in terms of fire-risk mitigation, multipurpose network systems then achieve greater cost-effectiveness over alternate systems.

17. ***Residential Sprinklers and Housing Economics. A legislators guide to Life Safety***

February 2009
Buddy DeWar
Independent analyst who debunks numerous myths about fiscal impact specific to residential fire sprinklers complete with validated data.

18. ***International Residential Code and Fire Sprinklers***

November 2009
Minnesota Governor's Council on Fire Protection
Residential fire sprinklers were introduced in the 1970's for use in single- and two-family homes, but have never been required for installation by the model building codes in the United States on a nationwide basis. Recent action by the International Code Council has moved the requirement for the installation of these sprinklers in new single- and two-family homes into the most widely adopted of the model codes and brought the possibility of adoption to the state of Minnesota. This document provides an overview of information on residential fire sprinklers.

19. **United States Fire Administration Position on Residential Fire Sprinklers**

March, 2008
Federal Emergency Management Agency

20. **National Fire Protection Agency Comments on IRC Proposals**

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Insurance premium savings, based on an average metro homeowner's policy of $845, is between 5% and 12% per year or $42 and $101 per year. Over the course of 20 years the insurance savings equate to $840 to $2,020. This average is based on 2008 data from the Insurance Federation of Minnesota and is for the entire State. Predictably, the IRC will have greater consequence in the Metro area given that more new homes will likely be constructed there. Similarly, home values and thus, insurance coverage and policy premiums will be higher in the metro area than the State average resulting in greater savings to the metro homeowner via their insurance coverage.

For those interested in reforming government and reducing costs; sprinklers are the perfect solution as the recipient is the investor who realizes their return via the combination of insurance savings, trade-offs reduced property taxes and the confidence and comfort of knowing the level of protection provided by sprinklers is unequalled.

The combination of construction trade-offs and insurance savings over time will exceed the installation costs.

For those homes constructed as part of new developments, the additional cost reductions related to street construction and hydrant spacing (per the MN State Fire Code) will either result in further cost reductions to the homeowner or increased profitability for the developer/builder. Finally, when adding the reduced property taxes, the homeowner realizes further fiscal benefit.

In closing, the "Crusader" article and Bucks County Report provides additional evidence and proof that residential fire sprinklers are cost effective.

Other Factors to Consider Related to Proposed Code Change

1. Is this proposed code change meant to:

   x change language contained in a published code book? If so, list section(s).

   R302.14.5

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in a published code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   neither; this language will be new language, not found in the code book or in Minnesota Rule.

2. Is this proposed code change required by a Minnesota Statute or new legislation? If so, please provide the citation to the Statute or legislation.
   No

3. Will this proposed code change impact other sections of a published code book or of an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
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4. Will this proposed code change impact other parts of the Minnesota State Building Code? If so, please list the affected parts of the Minnesota State Building Code.
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5. Who are the parties affected or segments of industry affected by this proposed code change?
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6. Can you think of other means or methods to achieve the purpose of the proposed code change? If so, please explain what they are and why your proposed change is the preferred method or means to achieve the desired result.
   No

7. Are you aware of any federal requirement or regulation related to this proposed code change? If so, please list the regulation or requirement.
   No

443 Lafayette Road N.
St. Paul, Minnesota 55155
www.dli.mn.gov

MINNESOTA DEPARTMENT OF LABOR & INDUSTRY

(651) 284-5005
1-800-DIAL-DLI
TTY: (651) 297-4198

ADVISORY COMMITTEE COMMENT FORM
FOR PROPOSED CODE CHANGES
(This form must be submitted electronically)

IRC-138, R313.1

Author/requestor: Tom Brace

Email address: trbrace@comcast.com

Telephone number: 651-603-8827

Firm/Association affiliation, if any: FMAM / MSFCA

Proposed Code Change - Language

SECTION R313
AUTOMATIC FIRE SPRINKLER SYSTEMS

R313.1 Townhouse automatic fire sprinkler systems. An automatic residential fire sprinkler system shall be installed in *townhouses*.

Exception: An automatic residential fire sprinkler system shall not be required when *additions* or *alterations* are made to existing *townhouses* that do not have an automatic residential fire sprinkler system installed.

R313.1.1 Design and installation. Automatic residential fire sprinkler systems for *townhouses* shall be designed and installed in accordance with NFPA 13D or 13R as required or P2904.

R313.2 Two -family and single-family dwellings automatic fire systems. An automatic residential fire sprinkler system shall be installed in new one- and two-family *dwellings* in accordance with the following implementation schedule:

Upon adoption of this code, all new two family and single family dwellings exceeding 5000 square feet
On or after January 1, 2014 all new two family and single family dwellings exceeding 4000 square feet
On or after July 1, 2014 all new two family and single family dwellings exceeding 3000 square feet
On or after January 1, 2015 all new two family and single family dwellings exceeding 2000 square feet
On or after July 1, 2015 all new two family and single family dwellings shall be protected with automatic residential fire sprinklers in accordance with R313.2.1.

*Square feet shall include only habitable space.

Exception:
1. An automatic residential fire sprinkler system shall not be required for *additions* or *alterations* to existing buildings that are not already provided with an automatic residential sprinkler system.
2. An automatic residential fire sprinkler system shall not be required for non homesteaded cabins and seasonal buildings.
3. Sprinklers shall not be required in attached garages.
4. Conversion of an existing single family dwelling shall not constitute a change in use nor shall the conversion require installation of an automatic residential fire sprinkler system.

Proposed Code Change – Need and Reason

At the December 14, 2011 IRC Hearing the Minnesota Fire Chiefs Association (MSFCA) and Fire Marshal's Association (FMAM) provided the MN 1309 International Residential Code Committee with twenty scientific based research reports detailing a number of issues related to residential fire sprinklers. Those reports have been entered into the record and are summarized below.

Opponents of the code change continue to advocate for removal of the provision from the model code despite overwhelming evidence that sprinklers work, smoke detectors do not, and follow these arguments with exaggerated cost estimates. Of primary focus is their myopic argument that no deaths have occurred (according to their research) in homes built with interconnected smoke detectors. We believe this data analysis to be false, but more importantly, fails to recognize numerous other issues of equal and/or greater importance.

Cost/Benefit of Sprinklers:

1. Traditional fire suppression has proven to be inefficient, extremely costly, and extremely dangerous. Sprinkler requirements in commercial, industrial, educational and multi-family properties have substantially reduced the devastating impacts of fire specific to fatalities, injuries and property loss. While it will be a measure of time before the full benefit of residential sprinklers are realized, the traditional model of fire suppression is not sustainable. Sprinklers are the solution as the cost offsets including insurance and property tax savings will pay for every system and several times that over the life of the home.
2. Property taxes will be impacted favorably as departments can maintain volunteer/paid-on-call or more efficient career departments. Quantifying the amount is difficult to do, however, using Minnesota as an example and data from the Minnesota Taxpayers Association we rank 44th to 47th in per capita and per $1,000 income for fire protection as compared to the other 50 states. This is a function of our volunteer pension system which encourages longevity AND a strong building and fire code with many of the metropolitan communities adopting 1306 and other code provisions dating back to the early 1980's. For comparison, we see departments in the Twin City metro region with annual operating budgets of $750,000 to $2,000,000 protecting populations of 20,000 to 90,000 with volunteer/paid-on-call or duty crew models. Other cities of similar population across the nation have budgets two to three times this amount.
3. Fatalities of residents are clearly important and a justifiable criteria for sustaining the sprinkler provision in the code. However, of equal concern is that of responder safety. The fire service seldom knows if a home is occupied and must always assume it is, absent irrevocable proof. Thus, a fire in a residence will result in a fire department responding from which, at the moment in time that the alarm is sounded, risks escalate for both responders and citizens as evidenced by the number of fire, police, and ambulance crashes. Those risks continue in terms of both injury and fatality throughout the mitigation of the hazard (s) but also days and even years past the event as evidenced by the numerous studies of cardiac disease, respiratory disease, and cancer rates, all of which are disproportionately higher for emergency responders as compared to the rest of society.

In summary, the issue is far greater than homeowner deaths; rather, it is the combination of costs, risks, injuries and deaths. Sprinklers have proven themselves in all other occupancies (educational, industrial, commercial, assembly and multi-family) both the life safety side of the equation and also the fiscal side of the equation as proven by the tens of thousands of occupancies that have been constructed with sprinklers and are in operation today.

Additionally, sprinklers have been installed in thousands of twin homes, quad homes and condo's throughout the Twin Cities over the past decade or two with no apparent negative impact on builders' ability to "sell" their product as evidenced by the record number of units constructed.

MSFCA and FMAM recognize the need to address cost impacts in conjunction with the proven effectiveness of sprinklers. Simply put, sprinklers are so effective that traditional construction requirements are simply not needed given the undisputable effectiveness of sprinklers. To that end, we submit the changes as outlined above, which become redundant and therefore add cost to the construction of the home if the passive requirements are not removed from the code.

Reports

1. ***Smoke Alarms in U. S Home Fires***

   September, 2011
   National Fire Protection Association
   Almost all households in the U.S. have at least one smoke alarm, yet in 2005-2009, smoke alarms were present in less than three-quarters (72%) of all reported home fires and operated in half (51%) of the reported home fires. ("Homes" includes one- and two-family homes, apartments, and manufactured housing.) More than one-third (38%) of all home fire deaths resulted from fires in homes with no smoke alarms, while one-quarter (24%) resulted from fires in homes in which smoke alarms were present but did not operate. The death rate per 100 reported fires was twice as high in homes without a working smoke alarm as it was in home fires with this protection. Hardwired smoke alarms are more reliable than those powered solely by batteries.

2. ***Performance of Home Smoke Alarms Analysis of the Response of Several Available***

   Technologies in Residential Fire Settings
   February 2008
   National Institute of Standards and Technology
   This report presents the results of the project and provides details of the response of a range of residential smoke alarm technologies in a controlled laboratory test and in a series of real-scale tests conducted in two different residential structures. The data developed in this study include measurement of temperature and smoke obscuration in addition to gas concentrations for a range of fire scenarios and residences. The results are intended to provide both insight into siting and response characteristics of residential smoke alarms and a set of reference data for future enhancements to alarm technology based on fires from current materials and constructions. Smoke alarms of either the ionization type or the photoelectric type consistently provide time for occupants to escape from most residential fires, although in some cases the escape time provided can be short. Consistent with prior findings, ionization type alarms provide somewhat better response to flaming fires than photoelectric alarms, and photoelectric alarms provide (often) considerably faster response to smoldering fires than ionization type alarms. Escape times in this study were systematically shorter than those found in a similar study conducted in the 1970's. This is related to some combination of faster fire development times for today's products that provide the main fuel sources for fires, such as upholstered furniture and mattresses, different criteria for time to untenable conditions, and improved understanding of the speed and range of threats to tenability.

3. ***U.S. Firefighter Injuries 2010***

   2010
   National Fire Protection Association
   NFPA estimates that 71,875 firefighter injuries occurred in the line of duty in 2010. An estimated 32,675 or two-fifths (45.4%) of the all firefighter injuries occurred during fireground operations. An estimated 14,190

occurred during other on duty activities, while 13,355 occurred at nonfire emergency incidents. The leading type of injury received during fireground operations was strain, sprain or muscular pain (52.8%), followed by wound, cut, bleeding, and bruises (14.2%). Regionally, the Northeast had the highest fireground injury rate.

4. The Economic Consequences of Firefighter Injuries and Their Prevention. Final Report

August 2004
National Institute of Standards and Technology
Based on methods applied from two of the more relevant economic studies, the estimated cost of addressing firefighter injuries and of efforts to prevent them is $2.8 to $7.8 billion per year. The cost elements that comprised those two studies were based on workers compensation payments and other insured medical expenses, including long-term care; lost productivity; administrative costs of insurance; and others. Other costs heretofore have not been factored into assessments of firefighter injuries. The study team analyzed such elements as the labor costs of investigating injuries, along with the hours required for data collection, report writing, and filing. Another cost relates to what employers of firefighters pay to provide insurance coverage, and for safety training, physical fitness programs, and protective gear and equipment—all of these expenses are related to preventing injuries and reducing their severity. The study researchers were fortunate to obtain workers compensation information that was specific to the occupational codes for firefighters, a unique feature of this new research. Some of these expenses were applied to the total number of injuries, while others were factored around the total number of firefighters since they involve all firefighters, not just those who are injured. Estimates of these cost components alone accounted for $830 to $980 million in direct and indirect costs.

5. Total Cost of Fire in the United States

2011
National Fire Protection Association
The total cost of fire in the United States, as it is defined, is a combination of the losses caused by fire and the money spent on fire prevention, protection and mitigation to prevent worse losses, by preventing them, containing them, detecting them quickly, and suppressing them effectively. For 2008, that total cost is estimated at $362 billion, or roughly 2.5% of U.S. gross domestic product. Economic loss (property damage) – reported or unreported, direct or indirect represents only $20.1 billion of this total. The net costs of insurance coverage ($15.2 billion), the cost of career fire departments ($39.7 billion), new building costs for fire protection ($62.7 billion), other economic costs ($44.0 billion), the monetary value of donated time from volunteer firefighters ($138 billion), and the estimated monetary equivalent for the civilian and firefighter deaths and injuries due to fire ($42.4 billion), all are larger components than property loss.

6. Third Needs Assessment of the U.S. Fire Service

June, 2011
National Fire Protection Association
Fire service needs are extensive across the board, and in nearly every area of need, the smaller the community protected, the greater the need. Fire service needs have declined to a considerable degree in a number of areas, particularly personal protective and firefighting equipment, and two types of resources that received the largest shares of funding from the Assistance to Firefighters grants (AFG). Declines in needs have been more modest in some other important areas, such as training, which have received much smaller shares of AFG grant funds. In all areas emphasized by the AFG and SAFER grants, there is ample evidence of impact from the grants but also considerable residual need still to be addressed, even for needs that have seen considerable need reduction in the past decade.
There has been little change in the ability of departments, using only local resources, to handle certain types of unusually challenging incidents, including two types of homeland security scenarios (structural collapse

and chem/bio agent attack) and two types of large-scale emergency responses (a wildland/urban interface fire and a developing major flood). However, the surveys have indicated improvement in the development of written agreements to help in the use of outside resources. This may provide the strongest base on which to build, namely, the creation of regional and national agreements to allow costs of shared resources to be shared across a much wider area while also providing a protocol for any community to respond to an unusually challenging incident that is very unlikely within the community but not so unlikely within the entire region.

7. Fire Performance of Houses. Phase I. Study of Unprotected Floor Assemblies in Basement Fire Scenarios.

December, 2008
Institute for Research in Construction
Details high fire hazards of lightweight truss construction in residential construction and the increased threat to occupants as well as firefighters.

8. Report on Structural Stability of Engineered Lumber in Fire Conditions

September, 2008
Underwriters Laboratory
This report describes the fire resistive performance of nine assemblies tested as part of a fire research and education grant sponsored by the Fire Prevention and Safety Grants under the direction of the Department of Home Security/Federal Emergency Management Agency/Assistance to Firefighters Grants.

9. Report on Structural Stability of Engineered Lumber in Fire Conditions

January, 2009
Underwriters Laboratory
This report describes the fire resistive performance of three assemblies tested as part of a fire research and education program in cooperation with The City of Chicago Fire Department.

***10.* The Performance of Composite Wood Joists under Realistic Fire Conditions**

2008
Tyco
The results from this test series demonstrate that exposed, lightweight composite wood joists are likely to fail three to five minutes after compartment flashover for structures with typical residential loadings. Further, the time to collapse as measured from the start of flaming combustion for the fire scenarios employed in this test series was between 8 and 12 minutes. This relatively small timeframe prior to the failure of exposed composite wood joists may require the fire service to adopt alternative tactics and procedures for structures built using lightweight construction methods. This test program further highlights the dramatic differences between the sprinklered and un-sprinklered scenarios, as demonstrated through photographs, observations and data collected. All of the information presented shows that the addition of a sprinkler system can greatly enhance life safety of both residents and firefighters and aid in property protection. Today's homes contain more products with higher heat release rates than in previous years and the construction of these homes has become less fire resistant due to the use of lightweight construction materials. This combination has proven to be deadly for firefighters.

11. A Study of Metal Truss Plate Connectors when Exposed to Fire

January 2007
National Institute of Standards and Technology

The popularity of lightweight, metal plate connected wood truss construction is increasing due to cost effectiveness, versatility, and ease of construction. This type of construction brings many concerns to the firefighting community, since structural collapse has caused numerous injuries and fatalities in the fire service. In an attempt to determine the performance of metal plate wood truss connections during fire exposures, NIST conducted a series of twelve instrumented tests exposing one side of the test specimen to the thermal exposure. Load carrying ability of the metal plate truss connections was not measured during these tests. The tests were purely an attempt to study the heat transfer between the metal plate and the wood. Results from these tests suggest that the metal plates help to protect the wood beneath the plates. However, additional work is required to produce more detailed information.

12. Preventing Injuries and Deaths of Firefighters due to Truss Failure Systems

April 2005
National Institute for Occupational Safety and Health
Report provides details on in which firefighter deaths were due in some part to lightweight truss construction, the dangers of lightweight trusses in fire conditions, and need to make changes.

13. U.S. Experience with Sprinklers and Other Automatic Fire Extinguishing Equipment.

January 2009
Dr. John Hall, National Fire Protection Association
Automatic sprinklers are highly effective elements of total system designs for fire protection in buildings. They save lives and property, producing large reductions in the number of deaths per thousand fires, in average direct property damage per fire, and especially in the likelihood of a fire with large loss of life or large property loss. When sprinklers are present in the fire area, they operate in 93% of all reported structure fires large enough to activate sprinklers, excluding buildings under construction. When they operate, they are effective 97% of the time, resulting in a combined performance of operating effectively in 91% of reported fires where sprinklers were present in the fire area and fire was large enough to activate sprinklers. In homes (including apartments), wet-pipe sprinklers operated effectively 96% of the time. When wet-pipe sprinklers are present in structures that are not under construction and excluding cases of failure or ineffectiveness because of a lack of sprinklers in the fire area, the fire death rate per 1,000 reported structure fires is lower by 83% for home fires, where most structure fire deaths occur, and the rate of property damage per reported structure fire is lower by 40-70% for most property uses. In homes (including apartments), wet-pipe sprinklers were associated with a 74% lower average loss per fire. Also, when sprinklers are present in structures that are not under construction and excluding cases of failure or ineffectiveness because of a lack of sprinklers in the fire area, 95% of reported structure fires have flame damage confined to the room of origin compared to 74% when no automatic extinguishing equipment is present. When sprinklers fail to operate, the reason most often given (53% of failures) is shutoff of the system before fire began. (All statistics are based on 2003-2007 fires reported to U.S. fire departments, excluding buildings under construction.)

14. U.S. Experience with Sprinklers

May, 2011

National Fire Sprinkler Association

Automatic sprinklers are highly effective elements of total system designs for fire protection in buildings. They save lives and property, producing large reductions in the number of deaths per thousand fires, in average direct property damage per fire, and especially in the likelihood of a fire with large loss of life or large property loss. In 2009, 4.6% of occupied homes (including multi-unit) had sprinklers, up from 3.9% in 2007, and 18.5% of occupied homes built in the previous four years had sprinklers. When sprinklers are

present in the fire area, they operate in 91% of all reported non-confined structure fires large enough to activate sprinklers, excluding buildings under construction. When they operate, they are effective 96% of the time, resulting in a combined performance of operating effectively in 87% of reported non-confined fires where sprinklers were present in the fire area and fire was large enough to activate sprinklers. In homes (including multi-unit), wet-pipe sprinklers operated effectively 92% of the time. When wet-pipe sprinklers are present in homes that are not under construction and excluding cases of failure or ineffectiveness because of a lack of sprinklers in the fire area, the fire death rate per 1,000 reported structure fires is lower by 83%, and the rate of property damage per reported home structure fire is lower by 71%. When sprinklers fail to operate, the reason most often given (65% of failures) is shutoff of the system before fire began.

15. Home Fire Sprinkler Cost Assessment

September, 2008
Fire Protection Research Foundation
Comprehensive cost analysis of residential sprinkler system installation cost in U. S. at $1.61 per square foot as the national average. Assessment was conducted under oversight committee comprised of Fire, Home, Insurance and other interested stakeholders.

16. Benefit - Cost Analysis of Residential Sprinkler Systems

September 2007
National Institute of Standards and Technology
This report documents a benefit-cost analysis performed to measure the expected present value of net benefits resulting from the installation of a multipurpose network fire sprinkler system in a newly-constructed, single-family house. The benefits and costs associated with the installation and use of a fire sprinkler system are compared across three prototypical single-family housing types: colonial, townhouse, and ranch. The installation costs differ by housing types, with the colonial being the most expensive and the ranch the least. The benefits experienced by residents of single-family dwellings with sprinkler systems, as measured in this report, include reductions in the following: the risk of civilian fatalities and injuries, homeowner insurance premiums, uninsured direct property losses, and uninsured indirect costs. The primary costs examined are for initial purchase and installation of the sprinkler system. Maintenance and repair costs are not examined because they are negligible.
Results of the benefit-cost analysis show that multipurpose network sprinkler systems are economical. The expected present value of net benefits (PVNB) in 2005 dollars is estimated as $2919 for the colonial-style house, $3099 for the townhouse, and $4166 for the ranch-style house. A sensitivity analysis is performed to measure the variability of the results to changes in the modeling assumptions. The sensitivity analysis confirms the robustness of the baseline analysis. The PVNB ranges from $704 to $4801 for the colonial-style house, from $884 to $4981 for the townhouse, and from $1950 to $6048 for the ranch-style house. Multipurpose network systems are the lowest life-cycle cost systems because homeowners can perform their own regular inspections and maintenance, and thereby save on costs they would incur with other systems. Given that they provide a similar level of performance, in terms of fire-risk mitigation, multipurpose network systems then achieve greater cost-effectiveness over alternate systems.

17. Residential Sprinklers and Housing Economics. A legislators guide to Life Safety

February 2009
Buddy DeWar
Independent analyst who debunks numerous myths about fiscal impact specific to residential fire sprinklers complete with validated data.

18. International Residential Code and Fire Sprinklers

November 2009

Minnesota Governor's Council on Fire Protection
Residential fire sprinklers were introduced in the 1970's for use in single- and two-family homes, but have never been required for installation by the model building codes in the United States on a nationwide basis. Recent action by the International Code Council has moved the requirement for the installation of these sprinklers in new single- and two-family homes into the most widely adopted of the model codes and brought the possibility of adoption to the state of Minnesota. This document provides an overview of information on residential fire sprinklers.

19. **United States Fire Administration Position on Residential Fire Sprinklers**

March, 2008
Federal Emergency Management Agency

20. **National Fire Protection Agency Comments on IRC Proposals**

In addition to these reports we submit the following article and report into the record:

1. **The Crusader – National Fire Protection Association Journal**
   For years, Canadian homebuilder Murray Pound rejected home fire sprinklers based on notions of exorbitant cost and installation hassles. Now he's an outspoken sprinkler advocate on a mission to dispel the myths. What changed?
2. **Communities with Home Fire Sprinklers. The Experience in Bucks County, Pennsylvania**
   November 2011
   http://homefiresprinkler.org/images/stories/pdfs/BucksCountyReport.pdf

   Fire sprinkler systems have been saving lives, preventing injuries and limiting property loss since the mid-1800s. Initially used in manufacturing and commercial structures, over time the technology's unique protective qualities were extended to other occupancies, including residential structures. This is fortunate; homes have for decades been where the vast majority of structural fire deaths occur and that fact remains true today. In 2011, the National Fire Protection Association's (NFPA) 2010 fire loss survey showed that home fires accounted for 85%of all civilian fire deaths. Fire sprinklers are uniquely suited to protecting occupants of homes. Most fatal home fires occur at night, when people are typically sleeping. Working smoke alarms provide an early warning that can alert or awaken occupants so they can deploy their escape plan. However, smoke alarms can only detect and signal a fire; they do nothing to control it. Survival is dependent upon the occupants' willingness and ability to quickly and appropriately respond (normally, to escape). When a fire occurs in a home with a fire sprinkler system, the heat from that fire quickly activates the sprinkler closest to the fire (not the entire system). That action controls the fire while it is still small, and in many cases extinguishes it. Controlling a fire in this incipient stage limits the spread of deadly heat and smoke, and prevents flashover (the point at which everything in the room ignites). Sprinklers give occupants a safe window of opportunity to escape the fire. This added time is especially valuable for the more vulnerable populations – young children, older adults, and people with disabilities that limit their mobility.
   This report looks at home fire sprinkler installation in six municipalities in Bucks County, Pennsylvania. These municipalities were selected because sprinkler installation was required in those jurisdictions at varying times over several decades. That widespread use provided our researchers with a unique picture of home fire sprinkler installation and the opportunity to compare that experience with homes in the same municipalities that do not have sprinklers installed. The six municipalities include Buckingham Township, Ivyland Borough, New Britain Township, Warrington Township, Warwick Township and Wrightstown Township. Each is located in the central portion of the County, and has undergone significant growth since the 1980s. The jurisdictions range from rural to suburban, with and without public water service.
   This report focuses on the life safety advantages of installing home fire sprinkler systems, primarily the prevention of civilian fire deaths. Some attention is also given to the additional benefits of the technology, including injury prevention (civilian and firefighter), reduced tax rates and lower capital expenditures for community fire protection. Because most discussions about installing fire sprinkler systems in new homes include a debate about added costs, our report also investigated this aspect and reviewed the impact the

systems have had on development in the six communities. Our study illustrates many ways in which home fire sprinkler system installations have become an important part of the community fire protection plan for these jurisdictions. Most importantly, we recount the documented "life saves" that resulted when fires occurred in sprinklered homes.

Overall, there were 90 fire deaths in un-sprinklered one- and two-family dwellings in Bucks County from 1988-2010 (88%of all County fire deaths during that time frame), with no fire deaths occurring in sprinklered dwellings. Five fire incidents in sprinklered homes have been documented as saving at least five lives. The average property loss in the sprinklered home fire incidents was $14,000, with an average of 340 gallons of water used to extinguish the fires. These incidents can be compared to 51 fires in un-sprinklered homes in the six studied municipalities from 2005-2010, in which the average fire loss per incident was $179,896 and for those fires where water usage data was available, an average of 5,974 gallons (nearly 25 tons) of water was needed to extinguish the fires.

Proposed Code Change – Cost/Benefit Analysis

The proposed changes will decrease costs of construction from the current IRC requirements.

The phase-in process allows both the building industry and sprinkler industry time to adjust to the requirements and develop cost efficiencies. It is difficult and subject to quantify this amount; however, based on sound economic principles of market forces it is reasonable to conclude that significant savings will occur.

Trade-off savings will be substantial and vary based on site specific facts. Egress window installation ranges from $600 to $1,000 each. Under-floor protection costs range from $.50 cents a square foot to $1.10 per square foot. Fire blocking, draft stopping, penetrations protection costs vary with the home and construction types.

Insurance premium savings, based on an average metro homeowner's policy of $845, is between 5% and 12% per year or $42 and $101 per year. Over the course of 20 years the insurance savings equate to $840 to $2,020. This average is based on 2008 data from the Insurance Federation of Minnesota and is for the entire State. Predictably, the IRC will have greater consequence in the Metro area given that more new homes will likely be constructed there. Similarly, home values and thus, insurance coverage and policy premiums will be higher in the metro area than the State average resulting in greater savings to the metro homeowner via their insurance coverage.

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The combination of construction trade-offs and insurance savings over time will exceed the installation costs.

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In closing, the "Crusader" article and Bucks County Report provides additional evidence and proof that residential fire sprinklers are cost effective.

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   R313.1.1
R313.2

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

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7. Are you aware of any federal requirement or regulation related to this proposed code change? If so, please list the regulation or requirement.
   No

SUMMIT
FIRE PROTECTION

April 13, 2012

Mike Allen Home Builders
5322 Scenic Oak Drive SW
Rochester, MN 55902

Attention: Mr. Mike Allen

Regarding: Automatic Sprinkler Proposal
Byron House

Dear Mike,

We wish to submit the following proposal for the installation of automatic sprinklers throughout the new building.

SCOPE OF WORK:
Summit Fire Protection shall provide material and labor to install a wet sprinkler system throughout the house in accordance with NFPA and City of Byron requirements.

DESIGN CRITERIA:
System design shall be based on NFPA 13D. The garage is not included in the proposal.

SPRINKLERS:
Chrome or white finish sprinklers shall be installed on concealed plastic pipe.
Brass finish sprinklers shall be installed on exposed pipe.

MAIN VALVE ASSEMBLY:
The valve assembly shall consist of a check valve, flow switch, pressure gauge and drain. A pump and tank shall be provided and installed. Electrical by others.

MATERIAL:
All fittings, hangers and apparatus will be furnished and installed in accordance with the National Fire Protection Association.

FIRE DEPARTMENT CONNECTIONS:
Not provided.

SALES TAX:
This proposal includes sales tax.

BUILDING PERMIT:
This proposal includes the necessary building permits for the installation of automatic sprinklers.

SHOP DRAWINGS:
Summit Fire Protection will develop detailed shop drawings, and submit them to the State Fire Marshall for approval, prior to installation.

HYDROSTATIC TEST:
To ensure the absences of leaks, all new system piping will be pressurized to 200 PSI for a period of two hours and witnessed by the City.

LABOR AND/OR MATERIALS TO BE FURNISHED BY OTHERS:
1. Painting of sprinkler pipe and material.
2. Electrical service and connections to sprinkler equipment.
3. Garage or attic protection.

GUARANTEE:
Summit Fire Protection will repair or replace any defective system component for a period of one year. This guarantee does not cover items caused by vandalism nor owners misuse.

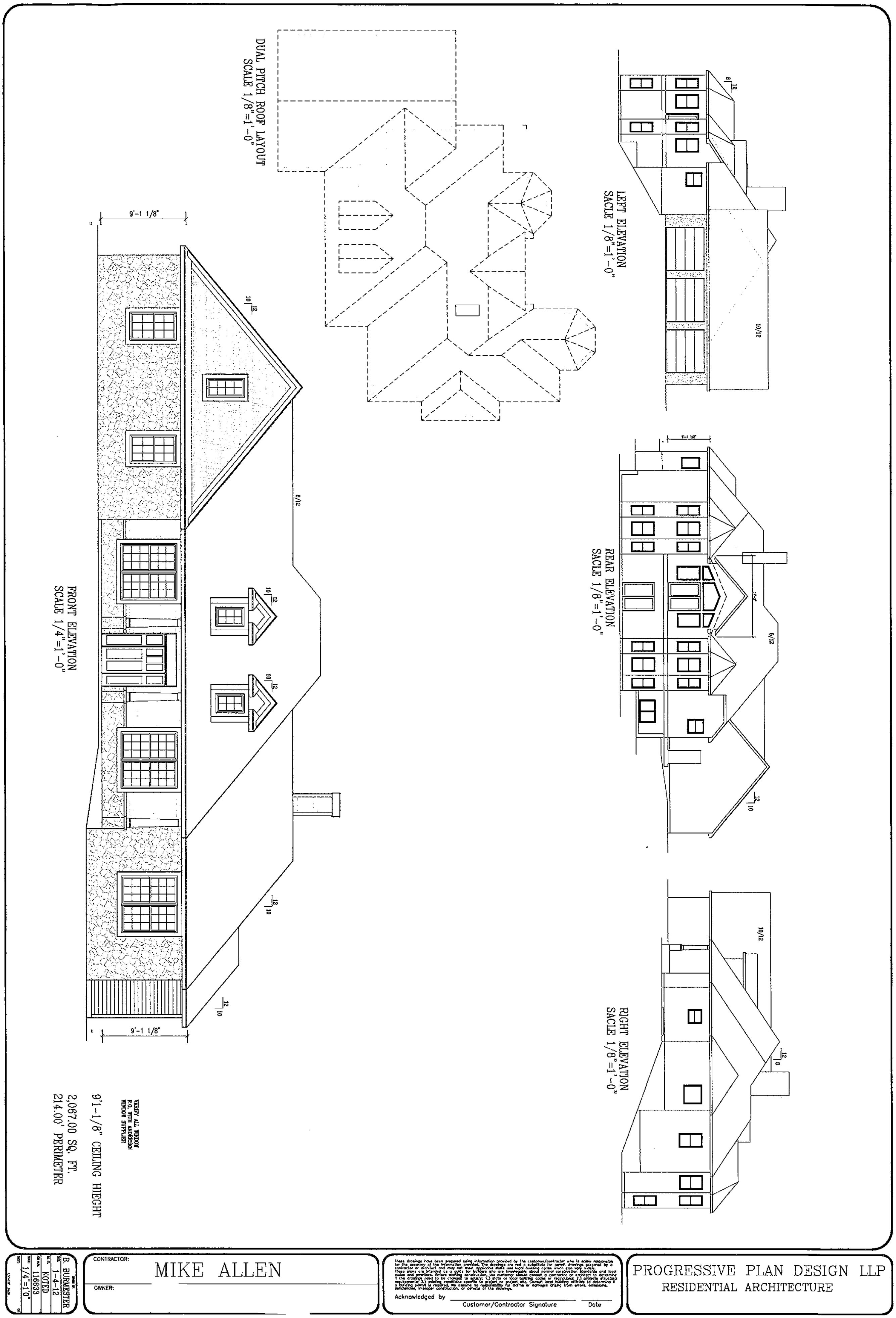
CONTRACT PRICE:
We propose to perform the above work for the sum of $12,600.00

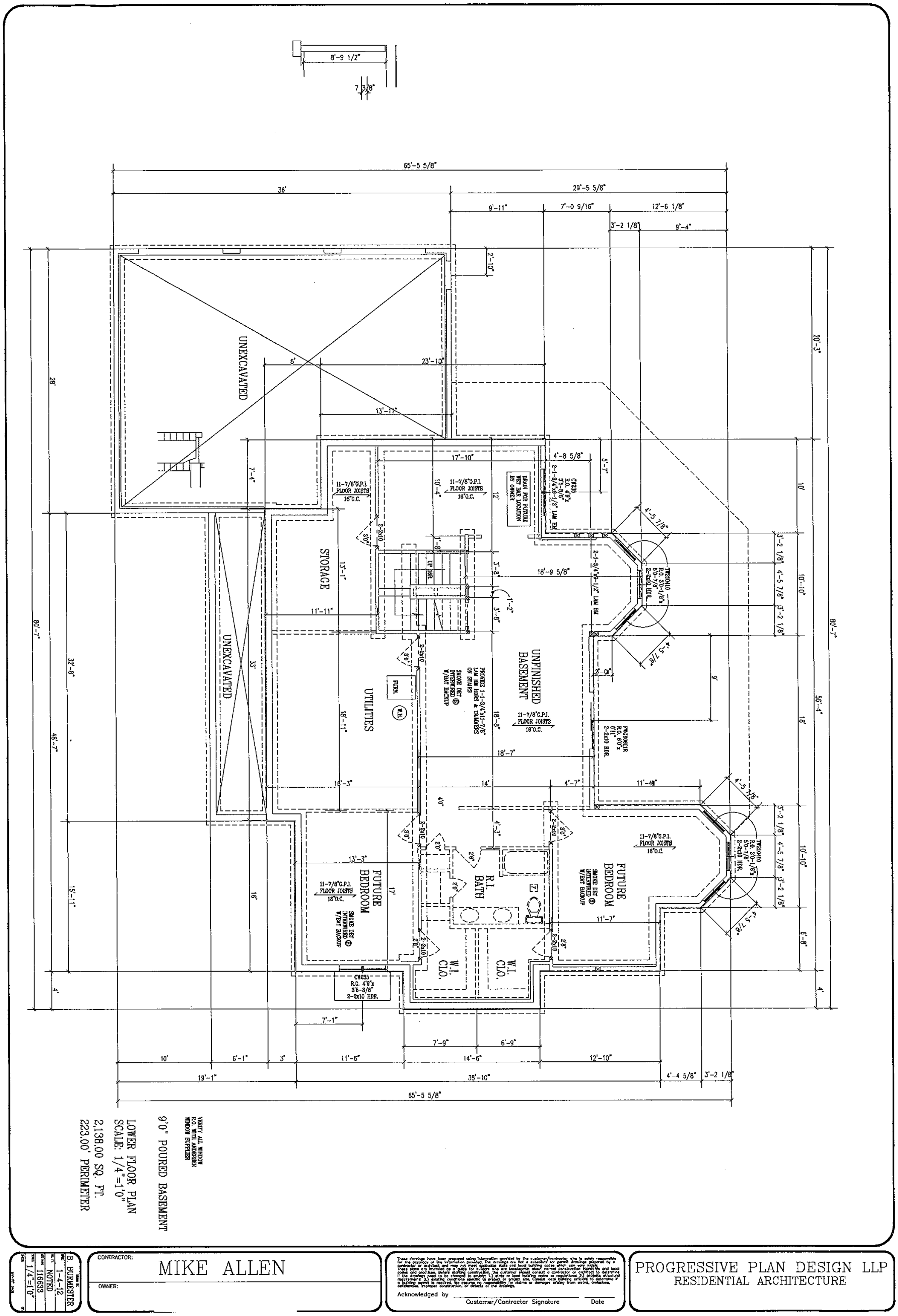
*This proposal may be withdrawn if not accepted within 30 days.

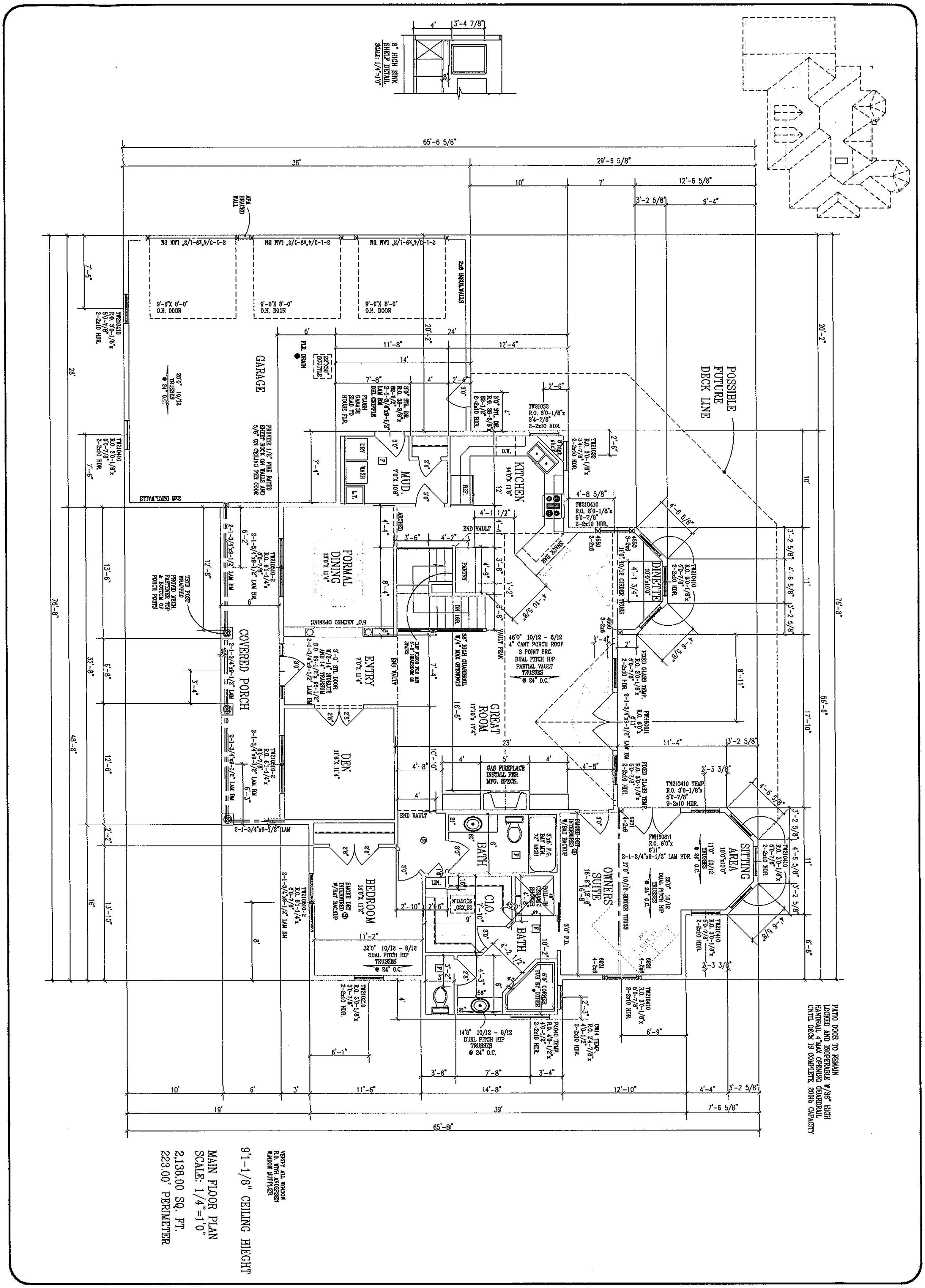
Very truly yours,

SUMMIT FIRE PROTECTION

Thomas E. Meddock
Vice President


DUAL PITCH ROOF LAYOUT
SCALE 1/8"=1'-0"
LEFT ELEVATION
SACLE 1/8"=1'-0"
FRONT ELEVATION
SCALE 1/4"=1'-0"
REAR ELEVATION
SACLE 1/8"=1'-0"
RIGHT ELEVATION
SACLE 1/8"=1'-0"
9'-1 1/8"
8/12
10/12
9'-1-1/8" CEILING HIGHT
2,067.00 SQ. FT.
214.00' PERIMETER
VERIFY ALL WINDOW
R.O. WITH ANDERSEN
WINDOW SUPPLIER
B. BURMESTER
1-4-12
NOTED
116833
1/4"=1'0"
CONTRACTOR:
MIKE ALLEN
OWNER:
Acknowledged by
Customer/Contractor Signature
Date
PROGRESSIVE PLAN DESIGN LLP
RESIDENTIAL ARCHITECTURE


UNEXCAVATED
STORAGE
UTILITIES
UNFINISHED BASEMENT
FUTURE BEDROOM
R.I. BATH
W.I. CLO.
9'0" POURED BASEMENT
LOWER FLOOR PLAN
SCALE: 1/4"=1'0"
2,198.00 SQ. FT.
223.00' PERIMETER
CONTRACTOR:
MIKE ALLEN
OWNER:
Acknowledged by
Customer/Contractor Signature
Date
PROGRESSIVE PLAN DESIGN LLP
RESIDENTIAL ARCHITECTURE



B. BURMEISTER	1-4-12
116633	NOTED
1/4"=1'0"	

CONTRACTOR: MIKE ALLEN

OWNER:

Acknowledged by ______ Customer/Contractor Signature ______ Date

PROGRESSIVE PLAN DESIGN LLP
RESIDENTIAL ARCHITECTURE

A.G. O'BRIEN FIRE PROTECTION

4907 LIGHTNING DRIVE
HERMANTOWN, MN 55811
PHONE # 218-729-9662
FAX # 218-729-9774

Proposal

To: **Billman Construction**
5010 Miller Trunk Hwy
Duluth, MN 55811
Attn: Jim
Fax # 729-5007

Date: 5/18/2012

Re:
Fire Sprinkler System

A.G. O'Brien Plumbing and Heating Co. proposes to design and install a wet piped automatic sprinkler system per NFPA 13D and the State of Minnesota fire code. Work in the proposal is bid for normal working hours.

Fire Sprinkler System **$ 7,298.00**

- Electrical wiring is not included. Flow, tamper devises or fire alarm.
- Additional soffits may be required in vaulted ceiling areas to conceal piping.
- 2" city water service into building.

If a city water supply is not available to supply the fire sprinkler systems a water storage tank and pump will be required.

Installation of tank and pump **$ 4,680.00**

Approx 4' x 4' area will be required to set tank and pump.
Electrical wiring of the pump is not included in this price.
Plumbing contractor will need to provide a tank fill line near the tank/pump location

Respectfully submitted,

A.G. O'Brien Fire Protection

Craig Johnson

5010 MILLER TRUNK HWY. DULUTH, MINNESOTA 55811

Billman Construction, Inc.

218-729-7570
FAX 218-729-5007
AMERICA BUILDS WITH BILLMAN'S

5-18-2012

Karen Linner

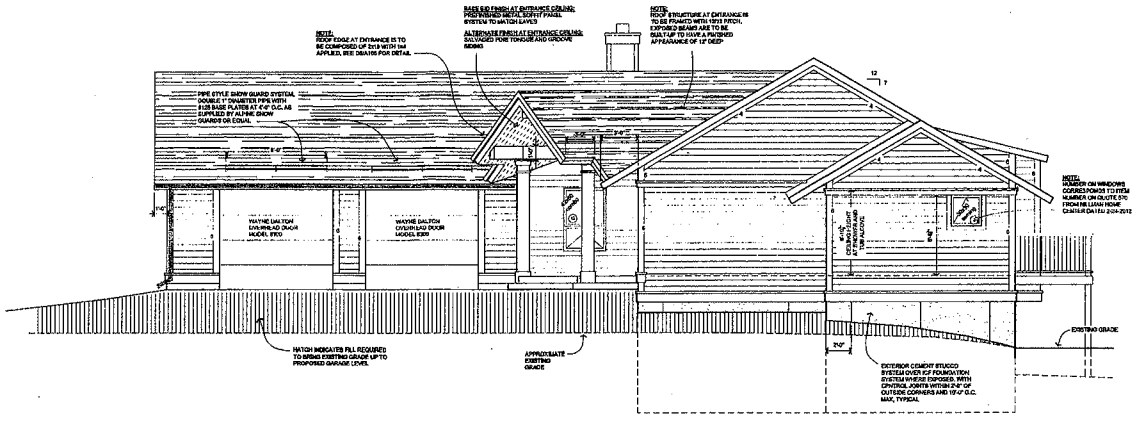
RE: Fire Sprinkler Bid Proposal.

Cost to install sprinkler system on Coughlan-Wheeler residence in Fredenberg Township.

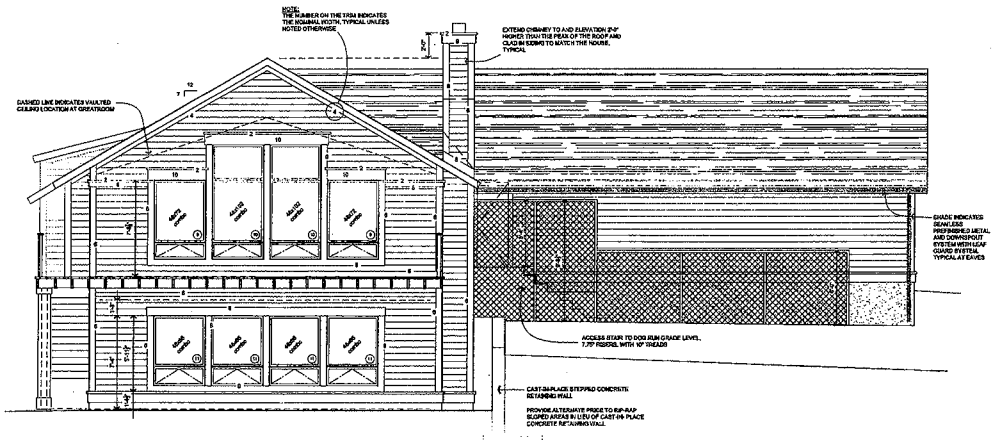
Sprinkler System	7,298.00
Tank & Pump	4,680.00
Electrical (no alarms)	250.00
Plumbing	125.00
Soffit & beam framing for vaults	2,650.00
	15,003.00 ←
10% Overhead	1,500.30
10% Profit	1,650.33
Total Cost	18,153.63

Sincerely,

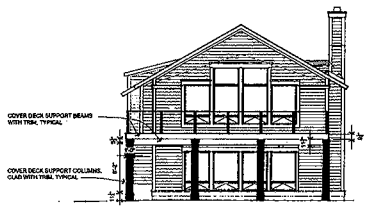
Jim Haitli
Project Estimator
Billman Construction, Inc.



C3 SOUTH ELEVATION
1/8" = 1'-0"



A3 NORTH ELEVATION WITHOUT DECK SHOWN
1/8" = 1'-0"



A1 NORTH ELEVATION WITH DECK SHOWN
1/8" = 1'-0"

SJA Architects
Duluth I St. Cloud I St. Paul
11 East Superior St. Ste. 340
Duluth, Minnesota 55802
Phone (218) 724-8578
Fax (218) 724-8717
www.sja-architects.com

CONSULTANTS

CONSTRUCTION DOCUMENT
March 5, 2012

PROJECT

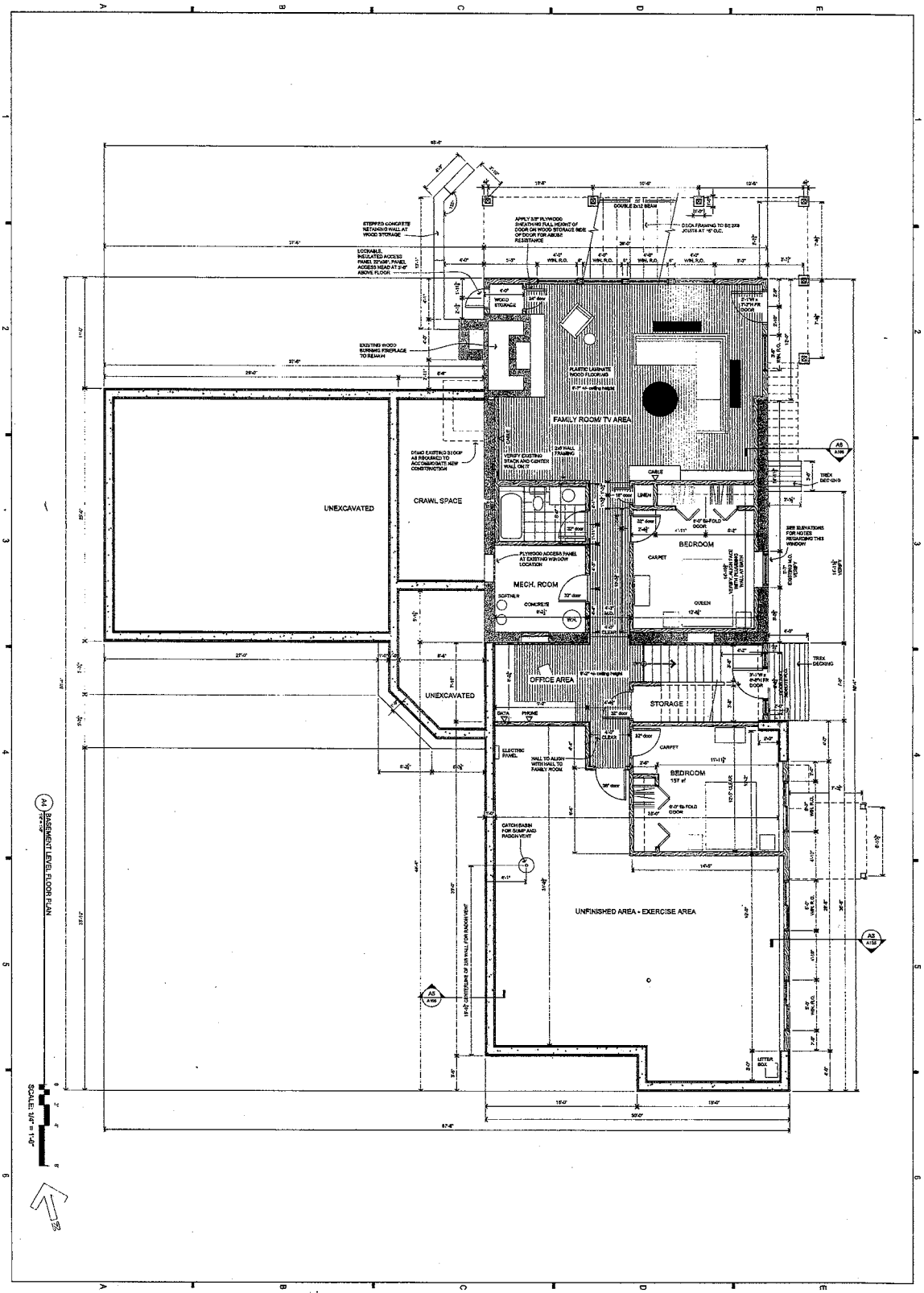
SHEET TITLE

EXTERIOR ELEVATIONS

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:
Print Name:
Date: License No:
Drawn By: Sheet No:
Checked By:
Job No.: 100945
Drawing No.:

A103



SJA Architects
Duluth | St. Cloud | St. Paul
11 East Superior St. Ste. 340
Duluth, Minnesota 55802
Phone (218) 724-8578
Fax (218) 727-0171
www.sjaarchitects.com

CONSULTANTS

CONSTRUCTION DOCUMENT
March 5, 2012

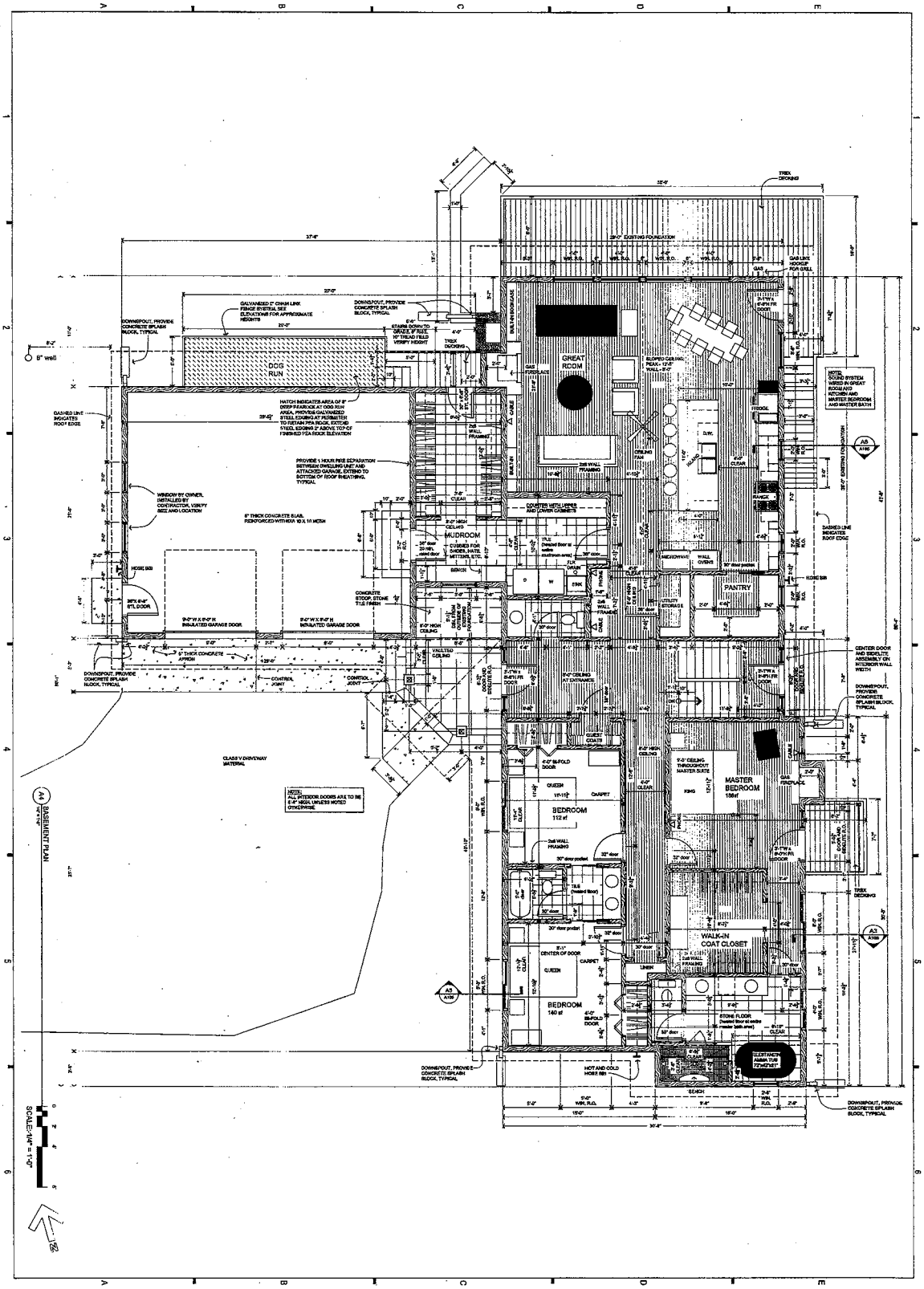
PROJECT

BASEMENT LEVEL
FLOOR PLAN

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

SHEET

A101



SJA Architects
Duluth | St. Cloud | St. Paul
11 East Superior St. Ste. 340
Duluth, Minnesota 55802
Phone (218) 724-8578
Fax (218) 724-8777
www.sjaarchitects.com

CONSULTANTS

CONSTRUCTION DOCUMENT
March 5, 2012

MAIN LEVEL
FLOOR PLAN

A102

Michaels Plumbing

3361 Westview Road
Willmar, MN 56201
320-212-8227
320-235-0871 Home
320-235-9779 FAX

KOMPLIEN
CHAD
04-10-2012

BID - $ 16,400.00

SPRINKLER BID IS SEPARATE

ALL OTHER PLUMBING

MASTER BATH - [WHITE & CHROME]

1	BATH BAY 5-FT	LASCO
1	TUB & SHOWER FAUCET # 13 - SERIES	DELTA
1	STOOL & SEAT - 18"	PRO FLO
2	LAV SINK - DROP IN	PRO FLO
2	LAV FAUCET # 540	DELTA

OTHER BATH WHITE & CHROME

1	BATH BAY 5-FT	LACSO
1	TUB & SHOWER FAUCET 13-SERIES	DELTA
2	LAV SINK DROP IN	PRO FLO
2	LAV FAUCET # 540	DELTA
1	STOOL & SEAT 18"	PRO FLO

1/2 BATH MAIN FLOOR [WHITE & CHROME]

1	STOOL & SEAT -	PRO FLO
1	LAV SINK - DROP IN	PRO FLO
1	LAV FAUCET # 540	DELTA

BASEMENT BATH

1	STOOL & SEAT 18"	PRO FOL
1	LAV SINK - DROP IN	PRO FLO
1	LAV FAUCET # 540	DELTA

KITCHEN. (WHITE & CHROME)

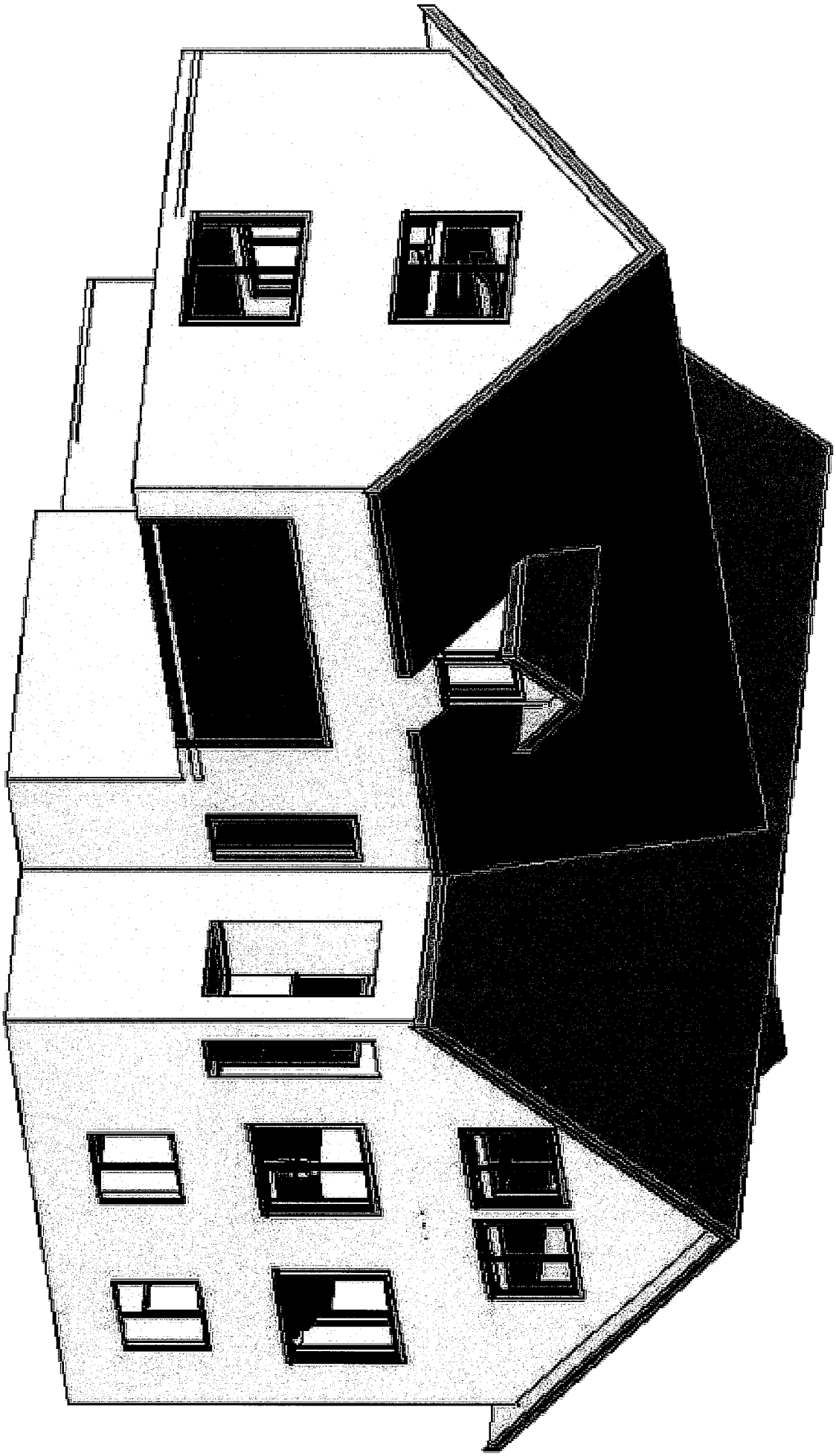
1	KITCHEN SINK - SS # PFT 332283	PRO FLO
1	KITCHEN SINK FAUCET # 300	DELTA
1	COLD HARD FAUCET # 20 440 000	GROHE
NO	GAR DISP # BADGER 5	ISE
	HOOK UP DISH WASHER	
	WATER LIN TO REF	

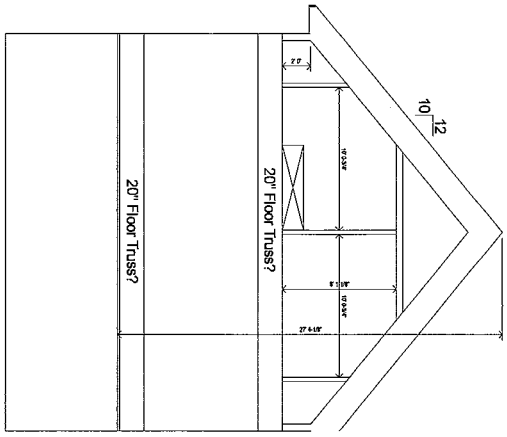
MECH ROOM

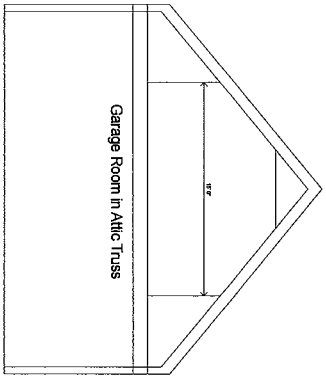
1	WATER HEATER - 50 GAL POWER VENT	A.O.SMITH
1	WASHER BOX	
1	2" FLOOR DRAIN	
1	SUMP PUMP & RADON VENT OUT	
NO	WATER SOFTNER	
NO	WATER & SEWER INTO HOUSE	

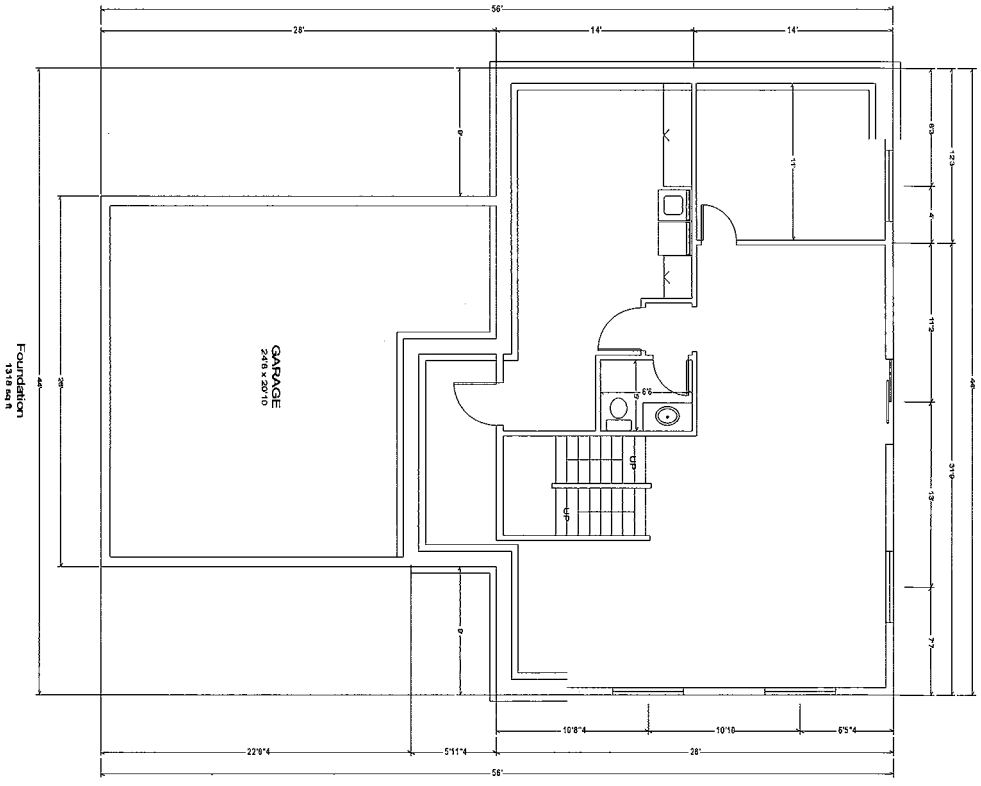
BID FOR SPRINKLER SYSTEM IN HOUSE
MET & LABOR INSTALLED & DESIGN FOR 4,379 SQ-FT HOUSE BID
WE WILL NEED TO SEND IN BLUE PRINTS TO HAVE DESIGN DONE.

16,500.00

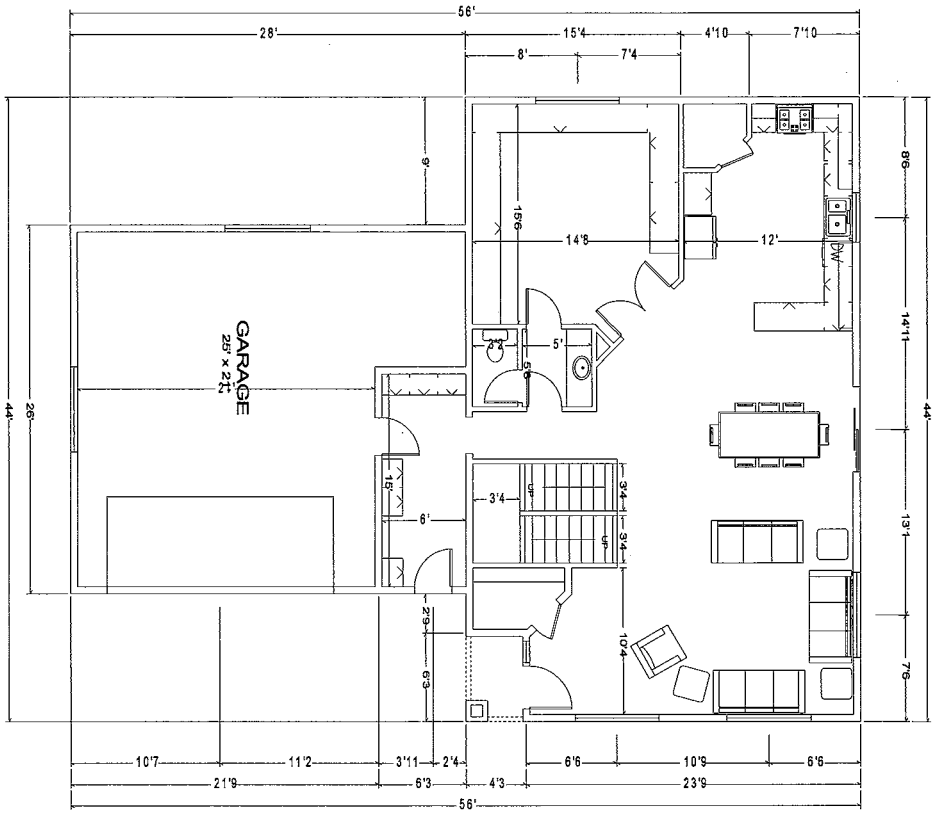




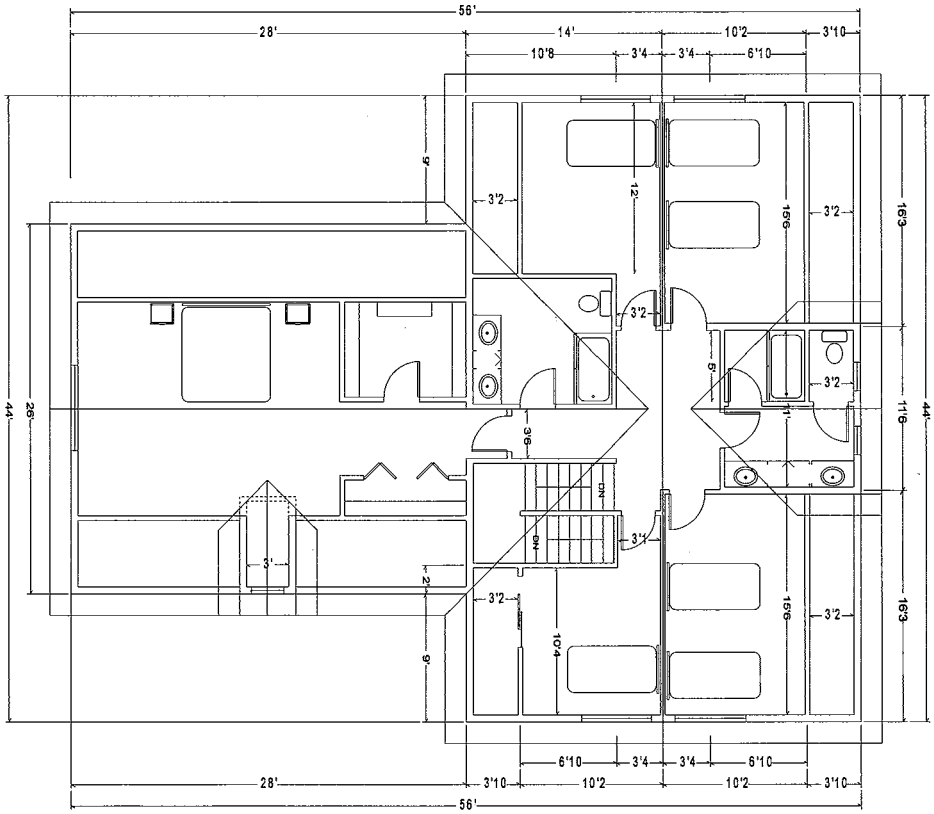




SHEET NO.	DATE	PROJECT #	New Home for: Pre Bid	Mike Kompelien Custom Homes Inc.
2 OF 2	April 10th 2012	2122?		310 Cty. Rd. 9 S.E. Willmar Mn Phone 320-235-7906 Fax 320-235-7999



Main Floor
1327 sq ft



Second Floor
1960 sq ft

PROJECT #		New Home for:	Mike Kompelien Custom Homes Inc.
212??		Pre Bid	310 Cty. Rd. 9 S.E. Willmar Mn Phone 320-235-7906 Fax 320-235-7999
DATE			
April 10th 2012			
SHEET NO.			
1 OF 2			

2834 GARFIELD
BID #1

SUMMIT
FIRE PROTECTION

Summit Fire Protection Co. Proposal and Contract

Summit Fire Protection Co. ("Summit Fire Protection") makes the following proposal (the "Proposal"):

Date: April 13, 2012

Submitted To: Becker Building & Remodeling ("Owner")
1901 17th Street NW
New Brighton, Minnesota

Attention: Cary Becker ("Owner") Fax: 651-483-8623 Phone: 612-363-0493

Regarding: Fire Protection Proposal

Project Name: **2834 GARFIELD STREET NE**
Minneapolis, Minnesota

Specifications: The equipment to be provided by Summit Fire Protection as part of these Specifications, as well as design and installation services, to the extent described in these Specifications, are sometimes referred to in this Proposal as the "Project".

Our proposal is based on Minneapolis, and NFPA 13D. Mechanical drawings, plumbing drawings and written specifications were not provided. Site visit- YES ☐ NO ☒

SCOPE OF WORK:

- Provide engineered fire protection drawings for permit and approval. AutoCAD compatible background drawings to be provided to Summit at no extra cost.
- Sprinkler heads to be white "residential" recessed pendents and white semi-recessed with cup sidewalls.
- Provide one (1) Combination horn/strobe (wired by others).
- Provide water flow switch on each riser (wired by others).
- Steel and/or CPVC piping throughout.

EXCLUSIONS:

- Soffits to conceal piping.
- Underground water supply to the building / testing to the underground piping. Underground size to be determined by hydraulic calculations and city of Minneapolis requirements.
- Protection of exterior overhangs and decks.
- Adequate heat to prevent water in pipe from freezing.
- Paint and/or painting of any sprinkler pipe/material.
- Masking of sprinkler heads prior to field paint.
- Fire pump and or water storage tank.
- Central monitoring of sprinkler system.
- Electrical wire and/or wiring of any kind.
- Payment/performance bonds.
- Factory Mutual Insurance requirements.
- Overtime.

Contract Price: We propose to perform the above work for the sum of:
$ 4,950.00 FOUR THOUSAND NINE HUNDRED FIFTY DOLLARS

Completion of the Project: Summit Fire Protection offers to provide to Owner the equipment, supplies and materials, as well as the design and installation services and labor to complete the Project, as described in the Specifications. This Proposal shall be null and void, at Summit Fire Protection's option, if not accepted by Owner by noon on May 14, 2012. Upon delivery by Owner of acceptance of this Proposal, we reserve the right to adjust all prices based on the cost of materials at the time of contract, due to the volatility in the steel market. The customer may be required to pay for materials at the time of contract to guarantee price. General Conditions: The Summit Fire Protection General Conditions attached to this Proposal are a part of this Proposal. Upon acceptance of this Proposal by Owner, the General Conditions will be a part of the contract between Summit Fire Protection and Owner.

Sincerely,
SUMMIT FIRE PROTECTION

Rex Nelson
Contract Sales Representative

OWNER ACCEPTANCE OF PROPOSAL

Summit Fire Protection's Proposal is hereby accepted and agreed to by Owner. Owner acknowledges that Owner received and read the Proposal and the attached General Conditions. Upon acceptance by Owner, this Proposal, along with the attached General Conditions, will be a binding contract between Summit Fire Protection and Owner.

OWNER:

Sign Name_____

Print Name_____

Date _____

1155591.1

SUMMIT FIRE PROTECTION CO. PROPOSAL AND CONTRACT GENERAL CONDITIONS

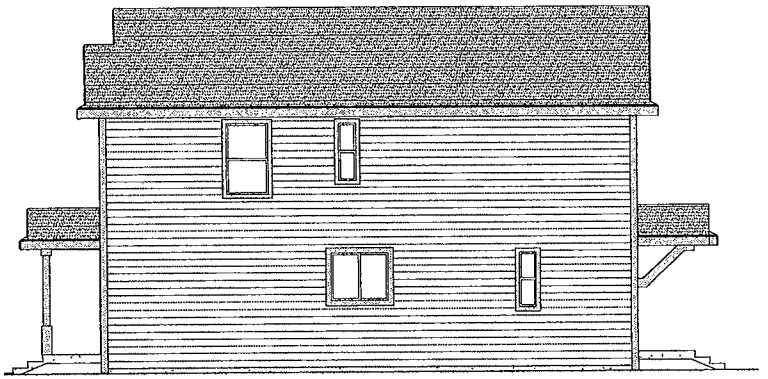
These General Conditions are attached to and made a part of the Summit Fire Protection Co. Proposal and Contract to which they are attached (the "Contract") as if fully set forth on the front page of the Contract. As used in these General Conditions, "Summit Fire Protection," "Owner," "Project," and "Contract Price" shall have the same meanings as those terms have in the Proposal.

1. Payment. Owner agrees to pay the Contract Price for the Project as and when required in the Proposal.

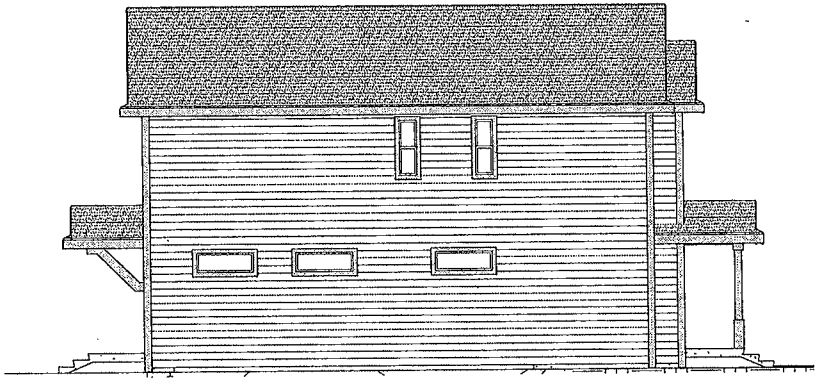
2. Changes. Except for substitutions, as described below in this paragraph, any alteration or modification to the Project must be documented and approved by Summit Fire Protection and Owner by a written change order signed by Summit Fire Protection and Owner. Summit Fire Protection reserves the right to require Owner to pay for all change order items (labor, equipment and any other materials) at the time of signing the change order. In the event of discontinuations, changes or the unavailability of specific equipment or materials described in the Specifications, Summit Fire Protection will have the right to substitute equipment and materials with substantially similar quality and features; provided, however, that if the replacement items are more expensive, then Summit Fire Protection shall notify Owner and Owner may elect whether to pay the additional expense (as an increase to the Contract Price) or to modify the Proposal to include less expensive items, if available, that would not increase the Contract Price.

BECKER BUILDING & REMODELING

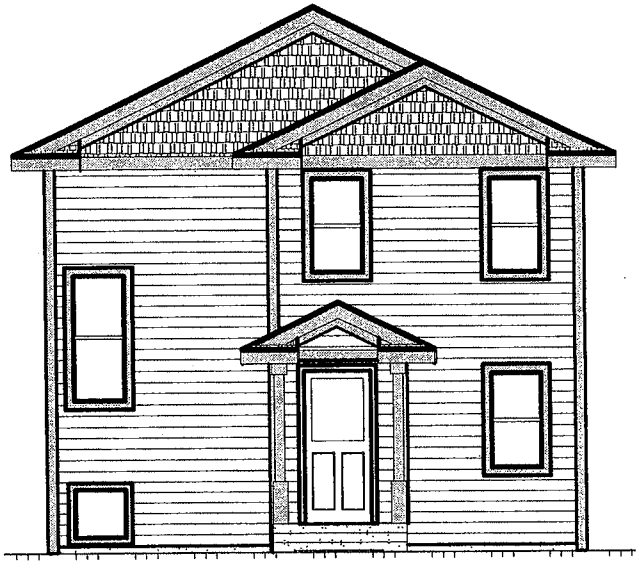
REAR ELEVATION



RIGHT SIDE ELEVATION

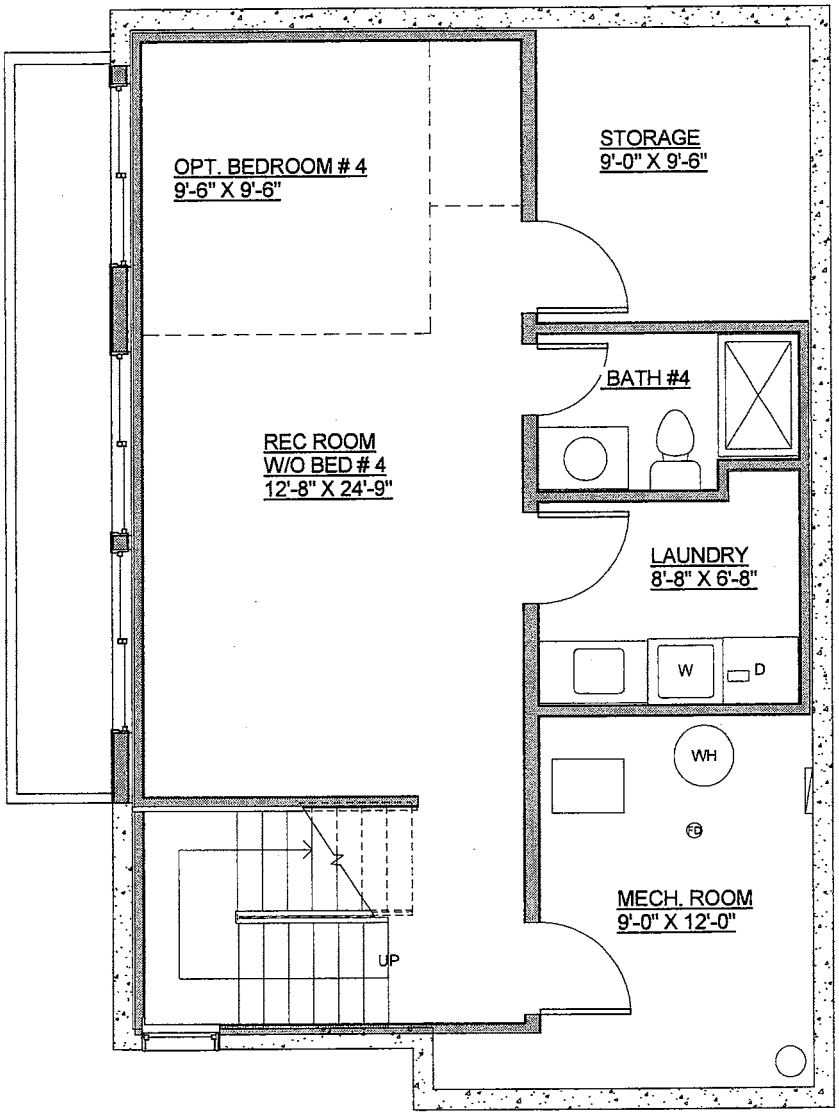


LEFT SIDE ELEVATION



FRONT (STREET) ELEVATION)

BECKER BUILDING & REMODELING



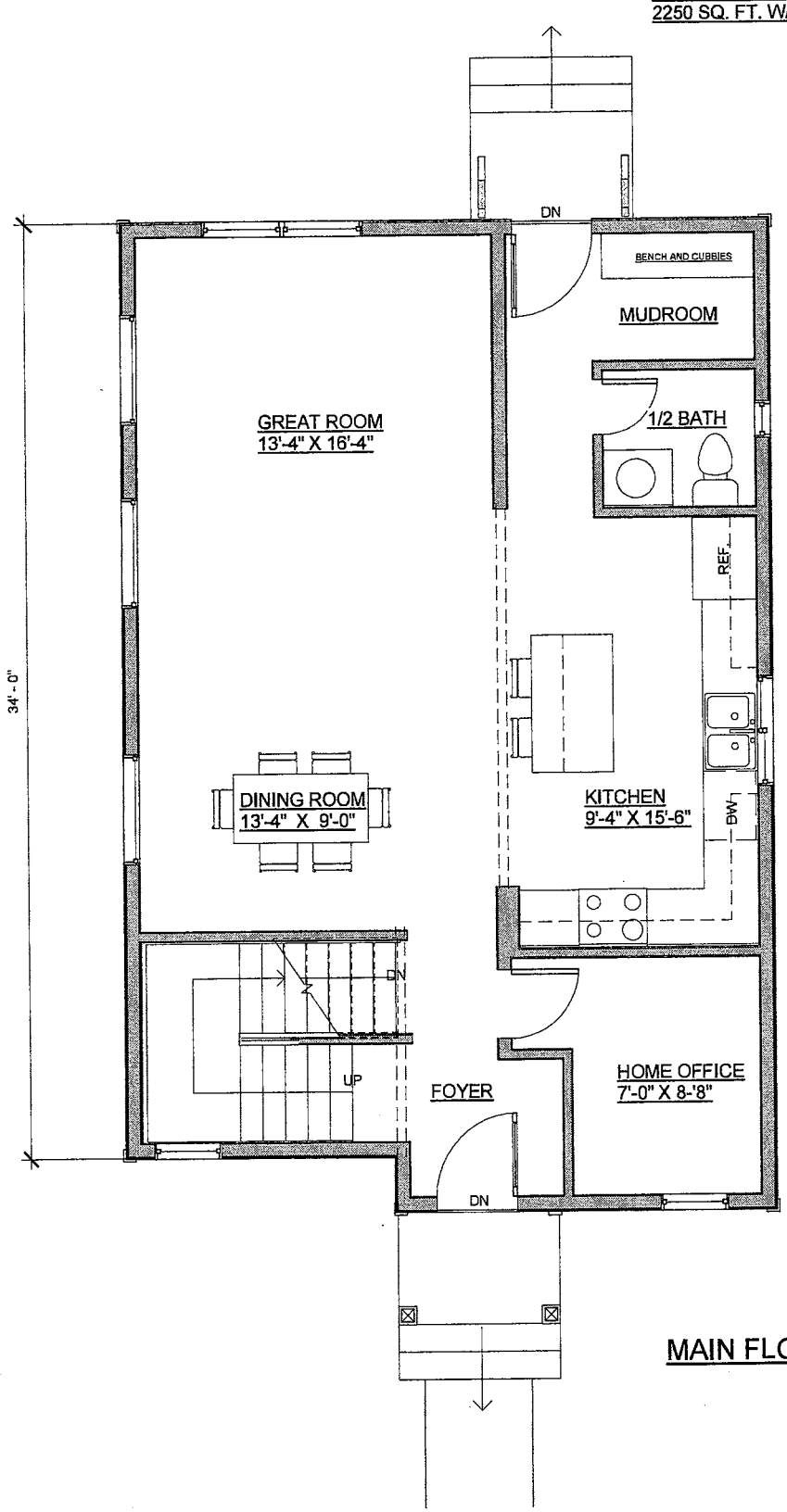
OPT. FINISH BASEMENT

BECKER BUILDING & REMODELING

FINISH HOUSE SQ. FT. LEGEND

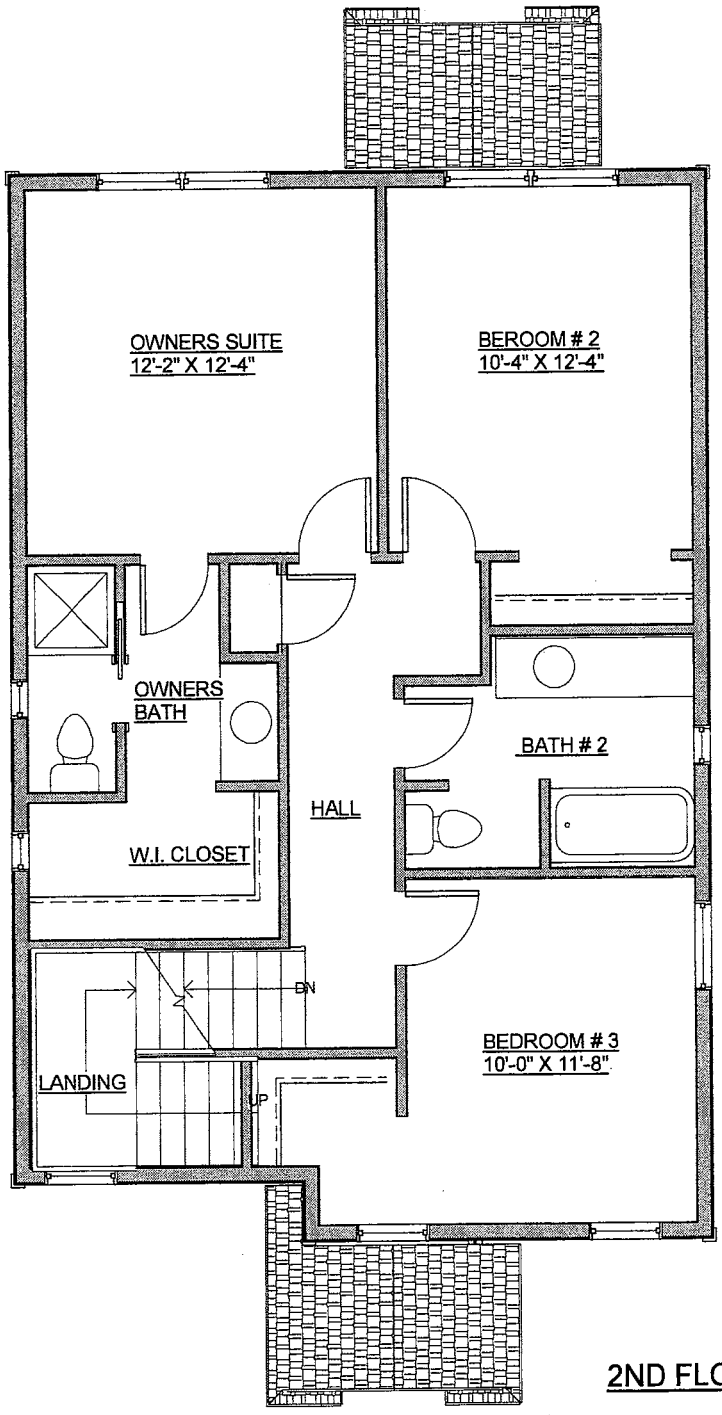
1. 844 SQ. FT.MAIN FLOOR PLAN
2. 844 SQ. FT.2ND FLOOR PLAN
3. 1688 SQ. FT.TOTAL FINISH SQ. FEET
4. OPTIONAL LOWER LEVEL SQ. FEET
5. 562 SQ.FT FINISH LOWER LEVEL
6. 204 SQ. FT. UNFISHED LOWER LEVEL
7. 766 SQ. FT TOTAL FIN + UNFINISHED

NOTE: TOTAL HOUSE FINISHED SQ. FT. 2250 SQ. FT. W/ FINISH BASEMENT



MAIN FLOOR PLAN

BECKER BUILDING & REMODELING



2ND FLOOR PLAN

Edina Realty

REAL ESTATE, MORTGAGE and TITLE CLOSING EXPERTS
Minnesota, Wisconsin, North Dakota and South Dakota

CLOSE

What's your home worth? Connect with an expert in your community and get a free market analysis

Property Details

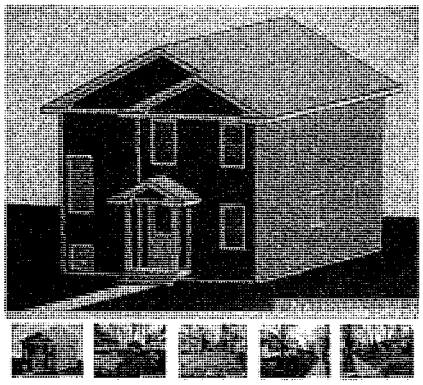
Request Information | Request Showing | Save This Property | View Saved Properties

Down Payment Assistance may be available

Price:
$299,000

2834 Garfield Street NE
Minneapolis, MN 55418

County: Hennepin
Beds: 3
Baths: 1 Full/1 Three-Qtr/1 Half
Sq ft: 2,054 (approx)
MLS#: 4135128
Status: Active



Unique opportunity to have new construction 2 story home in an established Minneapolis neighborhood. Open main level w/ hardwd floors, mud room, granite, crown molding,vaulted master suite, finished bsmt w/ lookout windows.Long established local builder.

Email Customer Service or Call (952) 928-5563

Request Information
Request Showing

Map / Directions | Print Brochure
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Save This Property
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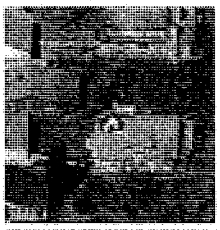
My Rating

Enter your listing note here

140 Submit



Minneapolis Real Estate

More information about **Minneapolis**
View other properties in **Minneapolis**

Details | History | Neighborhood | Map | Walk Score (66) | Mortgage

Last Update: 4/16/2012 7:09 AM

Listing Information

Property Type: Single Family

Bedrooms:	3	**Bathrooms:**	1 Full/1 Three-Qtr/1 Half		
Lot Size:	0.11 Acres	**Square Feet:**	2,054 (approx)	**Year Built:**	2012
Foundation:	844 Sq. Ft.	**Garage:**	Yes- 2 spaces	**Stories:**	2

General: New Construction
Finished Area: 2,054 Sq. Ft. (approx)
Water: City Water - Connected
Sewer: City Sewer - Connected

School Information

District: Minneapolis - 1

Room Information

Main Floor		Lower Floor	
Dining Room:	13.4x9	**Bedroom**	
Family Room:	16.4x13.4	**Office:**	8.8x7
Kitchen:	15.6x9.4	**Laundry Room:**	8.8x6.8
Mud Room			
		Upper Floor	
		Bedroom	10.4x12.4
		Bedroom:	10x11.8
		Bedroom:	12.2x12.4

Bathrooms

Full Baths: 1 **3/4 Baths:** 1 **1/2 Baths:** 1

Additional Room Information
Family Room: Main Level, Lower Level, Great Room
Dining: Informal Dining Room, Breakfast Area
Bath Description: Main Floor 1/2 Bath, Private Master, 3/4 Master, Rough In

Interior Features

Square FootageAbove/Below (approx): 1,688 Sq. Ft. Above Ground ,366 Sq. Ft. Below Ground
Appliances: Range, Microwave, Exhaust Fan/Hood, Dishwasher, Refrigerator, Disposal
Flooring: Hardwood, Tile
Cooling: Central Air
Heating: Gas Heat,Forced Air
Basement: Full, Drain Tiled, Sump Pump, Daylight/Lookout Windows, Egress Windows, Poured Concrete
Additional Interior Features: Natural Woodwork, Kitchen Window, Washer/Dryer Hookup

Exterior / Lot Features

Parking: 2 Garage Spaces,Detached Garage, Driveway - Concrete, Garage Door Opener
Exterior: Shakes, Metal, Vinyl
Lot Dimensions: 40 X 127.6
Zoning: Residential-Single
Additional Exterior/Lot Features: Road Frontage- City. City Bus (w/in 6 blks)

Community Features

Community Amenities: Bus Line

Driving Directions

Between Johnson and St Anthony Parkway off 29th Ave NE

Financial Considerations

Assessments:	$0	**Tax/Property ID:**	1202924120112
		Tax Amount:	$1,541
		Tax Year:	2011

Terms: FHA, DVA, Conventional, Cash

Recent Listing Price History (updated every 24 hours)

Original Price:$299,000 **Current Price:**$299,000 **Price Change:**$0

DATE	PRICE	CHANGE
3/28/2012 8:40:00 AM	$299,000	

Sign up to receive email alerts when this property's price changes Get Alerts

Courtesy: Re/Max Real Estate Properties

Customer Service Center
customerservice@edinarealty.com
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2834 GARFIELD
BID #2

VIKING AUTOMATIC SPRINKLER CO.

To: Becker Building & Remodeling LLC
1901 17th Street NW
New Brighton, MN 55112
Attn: Cary Becker

Date: April 10, 2012
Fax #: (651) 483-8623

Contractor License # C005

Re: 2834 Garfield St. NE

Viking Automatic Sprinkler shall provide a complete wet residential sprinkler system as per plans e-mailed on April 6, 2012. All material, design, fabrication, installation and testing shall be per NFPA 13D and Minneapolis code requirements. This proposal is based on an adequate city water supply. All work shall start at a 1" outlet (provided by the plumber) between the main water control valve and the domestic water meter. Concealed sprinkler sidewall and pendent sprinkler heads with white coverplates will be installed in areas with finished ceilings and brass heads shall be installed in areas exposed to structure.

The following items are specifically **excluded** from our proposal:

Fire alarm, monitoring and related equipment	Temporary power and services
Fire pump and related equipment	Domestic / process water supply solenoid shutoff
Access panels	Fire extinguishers
Painting or protection of pipe and components	Modification of building structure
Electrical Wiring	Adequate heat
Water Service	Overtime
Cutting and patching	Charges for electronic CAD files

We hereby propose to perform the above defined work for the sum of: **$6,675.00**

Six Thousand Six Hundred Seventy-Five Dollars

This proposal shall remain in effect for **30** days.

Viking Sprinkler will be signatory to those contracts which:

1. Cause Viking to provide indemnification for those acts for which it is responsible and not those for which others are responsible.
2. Provide for payment from the contractor without precedent payment by others.
3. Allow Viking Sprinkler to maintain its lien rights in the event of non-payment of legitimate billings within a reasonable amount of time.
4. Recognize that we are signatory to a collective bargaining unit which may not allow our forces to work during a sanctioned work stoppage.

We will be happy to work with you in developing appropriate wording, or changes to wording, in contracts you normally use.

Our proposal is based upon using an unaltered "AIA Document #A401, Standard Form of Agreement Between Contractor and Subcontractor", or the "Minnesota AGC Standard

VIKING AUTOMATIC SPRINKLER CO.

Subcontract Agreement" with the standard "NECA/Mechanical Contractors Builder's Subcontract Agreement Rider "A" attached or this proposal form as the contract between our companies.

Sincerely,
Viking Automatic Sprinkler Company

Sean Flaherty
Sales Representative
(651) 558-3232

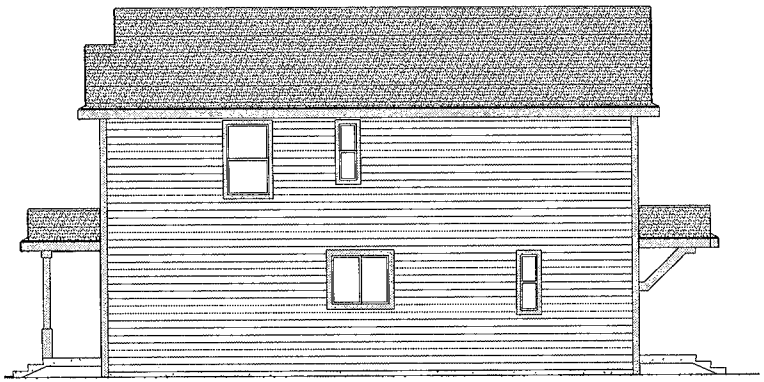
The Above proposal is accepted this _____ day of _____ 2012
By _____

Microbiologically Influenced Corrosion (MIC)
Testing for the presence of MIC contaminants, treatment of the water supply to counteract MIC and any damage to installed piping, resulting from an untreated or contaminated water supply, is excluded from this proposal.

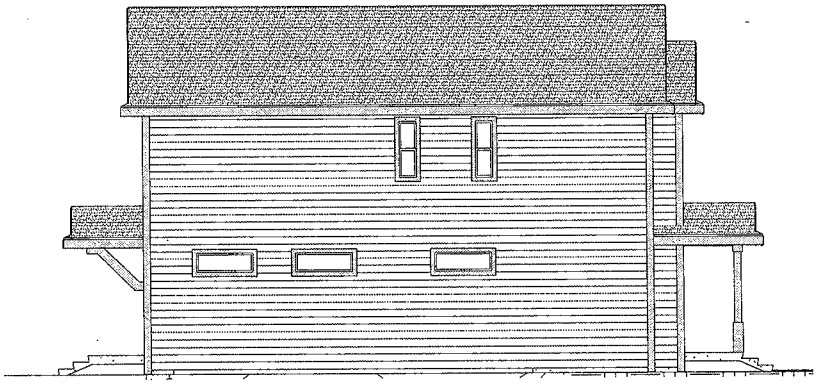
Due to the volatility of the steel market, we reserve the right to adjust all prices based on the cost of materials at the time of contract. The customer may be required to pay for materials at the time of contract to guarantee price.

BECKER BUILDING & REMODELING

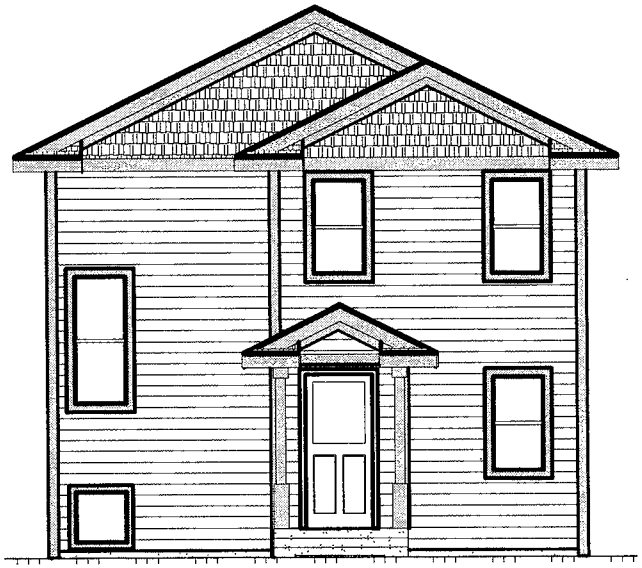
REAR ELEVATION



RIGHT SIDE ELEVATION

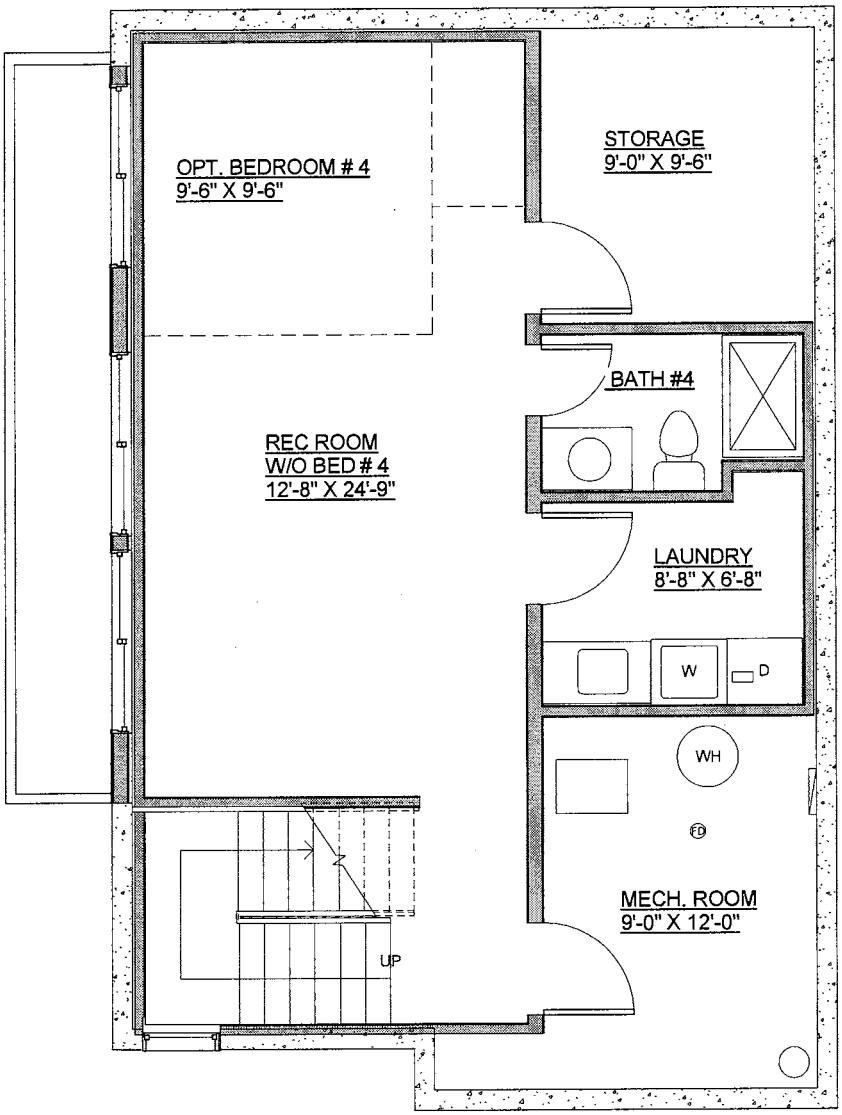


LEFT SIDE ELEVATION



FRONT (STREET) ELEVATION)

BECKER BUILDING & REMODELING



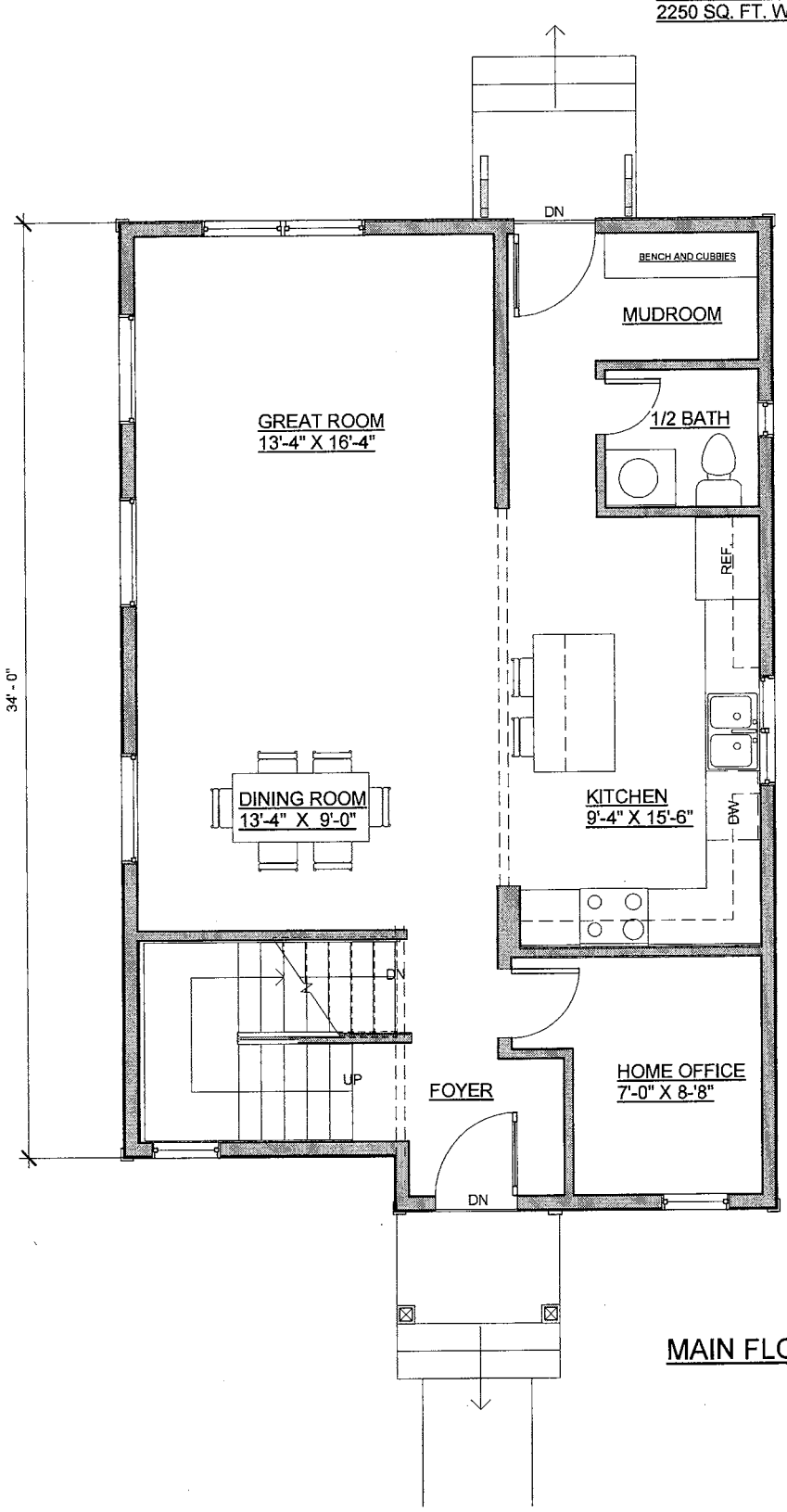
OPT. FINISH BASEMENT

BECKER BUILDING & REMODELING

FINISH HOUSE SQ. FT. LEGEND

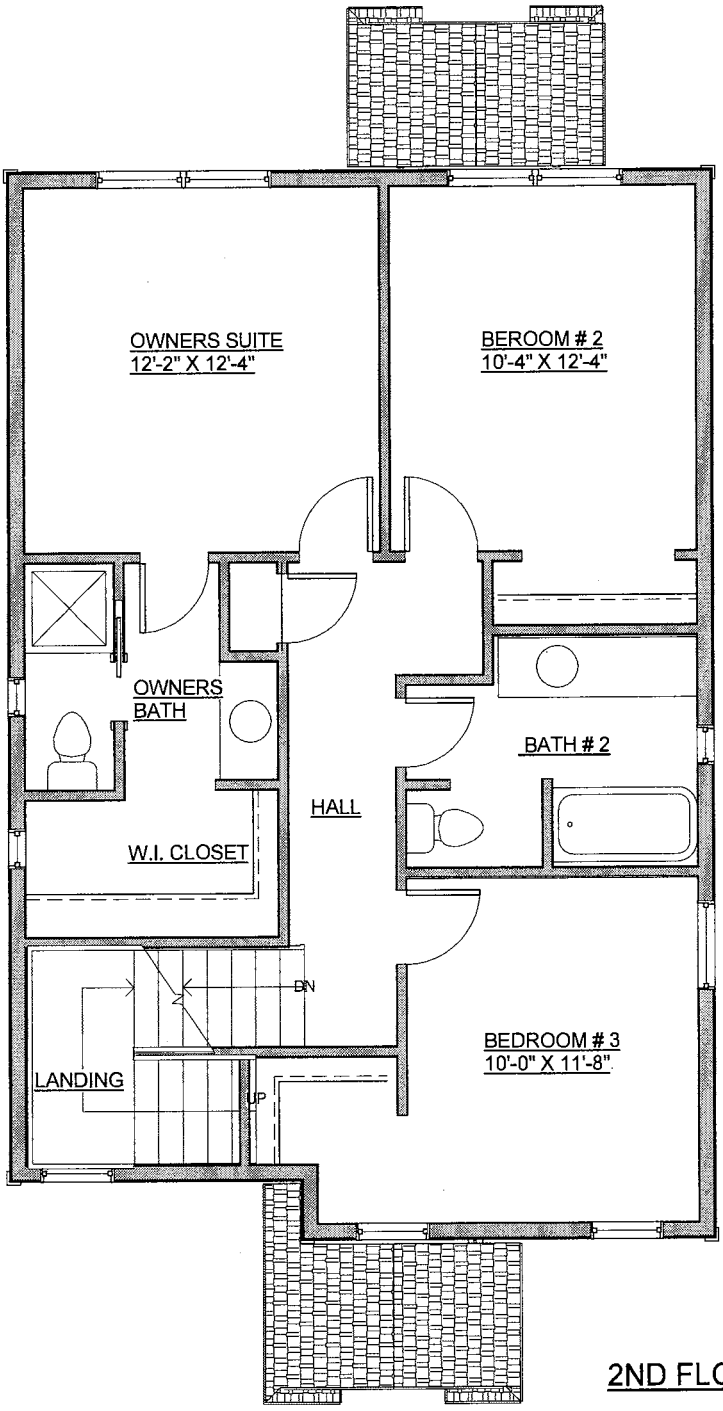
1. 844 SQ. FT.MAIN FLOOR PLAN
2. 844 SQ. FT.2ND FLOOR PLAN
3. 1688 SQ. FT.TOTAL FINISH SQ. FEET
4. OPTIONAL LOWER LEVEL SQ. FEET
5. 562 SQ.FT FINISH LOWER LEVEL
6. 204 SQ. FT. UNFISHED LOWER LEVEL
7. 766 SQ. FT TOTAL FIN + UNFINISHED

NOTE: TOTAL HOUSE FINISHED SQ. FT. 2250 SQ. FT. W/ FINISH BASEMENT



MAIN FLOOR PLAN

BECKER BUILDING & REMODELING



2ND FLOOR PLAN

Edina Realty
REAL ESTATE, MORTGAGE and TITLE CLOSING EXPERTS
Minnesota, Wisconsin, North Dakota and South Dakota

CLOSE

What's your home worth? Connect with an expert in your community and get a free market analysis

Property Details

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Down Payment Assistance may be available

Price:
$299,000

2834 Garfield Street NE
Minneapolis, MN 55418

County: Hennepin
Beds: 3
Baths: 1 Full/1 Three-Qtr/1 Half
Sq ft: 2,054 (approx)
MLS#: 4135128
Status: Active

Unique opportunity to have new construction 2 story home in an established Minneapolis neighborhood. Open main level w/ hardwd floors, mud room, granite, crown molding,vaulted master suite, finished bsmt w/ lookout windows.Long established local builder.

Email Customer Service or Call (952) 928-5563

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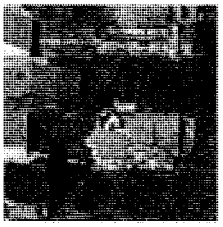
140 Submit



Minneapolis Real Estate

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View other properties in **Minneapolis**

Details | History | Neighborhood | Map | Walk Score (66) | Mortgage

Last Update: 4/16/2012 7:09 AM

Listing Information

Property Type: Single Family

Bedrooms:	3	**Bathrooms:**	1 Full/1 Three-Qtr/1 Half		
Lot Size:	0.11 Acres	**Square Feet:**	2,054 (approx)	**Year Built:**	2012
Foundation:	844 Sq. Ft.	**Garage:**	Yes- 2 spaces	**Stories:**	2

General: New Construction
Finished Area: 2,054 Sq. Ft. (approx)
Water: City Water - Connected
Sewer: City Sewer - Connected

School Information

District: Minneapolis - 1

Room Information

Main Floor		Lower Floor	
Dining Room:	13.4x9	**Bedroom**	
Family Room:	16.4x13.4	**Office:**	8.8x7
Kitchen:	15.6x9.4	**Laundry Room:**	8.8x6.8
Mud Room			
		Upper Floor	
		Bedroom	10.4x12.4
		Bedroom:	10x11.8
		Bedroom:	12.2x12.4

Bathrooms

Full Baths: 1 **3/4 Baths:** 1 **1/2 Baths:** 1

Additional Room Information
Family Room: Main Level, Lower Level, Great Room
Dining: Informal Dining Room, Breakfast Area
Bath Description: Main Floor 1/2 Bath, Private Master, 3/4 Master, Rough in

Interior Features

Square FootageAbove/Below (approx): 1,688 Sq. Ft. Above Ground ,366 Sq. Ft. Below Ground
Appliances: Range, Microwave, Exhaust Fan/Hood, Dishwasher, Refrigerator, Disposal
Flooring: Hardwood, Tile
Cooling: Central Air
Heating: Gas Heat,Forced Air
Basement: Full, Drain Tiled, Sump Pump, Daylight/Lookout Windows, Egress Windows, Poured Concrete
Additional Interior Features: Natural Woodwork, Kitchen Window, Washer/Dryer Hookup

Exterior / Lot Features

Parking: 2 Garage Spaces,Detached Garage, Driveway - Concrete, Garage Door Opener
Exterior: Shakes, Metal, Vinyl
Lot Dimensions: 40 X 127.6
Zoning: Residential-Single
Additional Exterior/Lot Features: Road Frontage- City. City Bus (w/in 6 blks)

Community Features

Community Amenities: Bus Line

Driving Directions

Between Johnson and St Anthony Parkway off 29th Ave NE

Financial Considerations

Assessments:	$0	**Tax/Property ID:**	1202924120112
		Tax Amount:	$1,541
		Tax Year:	2011

Terms: FHA, DVA, Conventional, Cash

Recent Listing Price History (updated every 24 hours)

Original Price:$299,000 **Current Price:**$299,000 **Price Change:**$0

DATE	PRICE	CHANGE
3/28/2012 8:40:00 AM	$299,000	

Sign up to receive email alerts when this property's price changes Get Alerts

Courtesy: Re/Max Real Estate Properties

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Information is deemed reliable but is not guaranteed.

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SUMMIT
FIRE PROTECTION

Summit Fire Protection Co. Proposal and Contract

April 25, 2012

Werschay Homes, Inc.
3423 County Road 74 Suite 101
St. Cloud, MN 56301

Attention: David R. Werschay Fax: Phone:

Regarding: Cascade Home

Specifications: The equipment to be provided by Summit Fire Protection as part of these Specifications, as well as design and installation services, to the extent described in these Specifications, are sometimes referred to in this Proposal as the "Project"

Our proposal is based on the City of St. Cloud requirements (State of MN), and NFPA 13. All work to be performed during normal working hours **Site visit- YES ☐ NO ☐ NEW ☒**

SCOPE OF WORK

- Provide design/build sprinkler shop drawings, hydraulic calcs for City/Insurance/Owner approval.
- Proposal based on plans/specifications dated: 12-29-11
- Permit cost for the fire sprinkler system
- Final acceptance testing of all components as dictated by NFPA 13D, 2002 including final two-hour 200 pound hydrostatic test
- Design/Build Sprinkler System (no specifications provided)
- All materials to be U.L. approved
- Provide (1) wet system throughout the residence
  - Required shutoff valves
  - Required tamper/flow switches
  - Required pressure gauges
  - Code required valve signage
- Provide U.L. listed 600 gallon water storage tank and fire pump rated at 50 psi at 60 gpm. (see cut sheets sent with proposal for more information/pricing)
- Coordination with other trades for complete installation
- Exposed Brass upright sprinklers in all areas where structure is exposed (assumed in the lower level mechanical room only)
- Semi-recessed pendants on the lower level and main level
- Semi-recessed horizontal sidewall sprinklers on the 2nd floor
- UL Listed CPVC Piping throughout
  - Piping run horizontally in the truss space on the lower level
  - Base bid to run piping vertically in the stud walls to feed the upper level
- All applicable taxes
- Mobilization as required
- Fire Caulking as required
- Includes Addendum(s): N.A.

CORPORATE:
575 MINNEHAHA AVENUE W
ST. PAUL, MN 55103
TEL (651) 251-1880
FAX (651) 251-1879

760 LIBERTY WAY
NORTH LIBERTY, IA 52317
TEL (319) 665-4330
FAX (319) 665-4331

3026 40TH AVENUE NW
ROCHESTER, MN 55901
TEL (507) 280-0622
FAX (507) 280-0577

418 GREAT OAK DRIVE
ST. CLOUD, MN 56387
TEL (320) 257-6390
FAX (320) 257-6392

EXCLUSIONS

- Painting of exposed piping
  - Heads will be cupped/masked off prior to ceiling/wall finishes
- Alarm Wiring
- Overtime labor
- Dry System(s)/Air compressors (see add/alternates)
- Other special application suppression systems (Clean Agent/Preaction etc.)
- Sleeves for pipe penetrations
- Site Power
- Central monitoring of sprinkler system
- Phone lines
- Any electrical installation
- Underground Utilities, our work to start at a flanged connection inside the residence

Base Bid: We propose to perform the work as described above for the sum of TWELVE THOUSAND ONE HUNDRED Dollars & no/100 Cents.

Base Price: $12,100.00

Completion of the Project: Summit Fire Protection offers to provide to Owner the equipment, supplies and materials, as well as the design and installation services and labor to complete the Project, as described in the Specifications. This offer for services shall be null and void, at Summit Fire Protection's option, if not accepted within 45 days from the date of this proposal. Upon delivery by Owner of acceptance of this Proposal, we reserve the right to adjust all prices based on the cost of materials at the time of contract, due to the volatility in the steel market. The customer may be required to pay for materials at the time of contract to guarantee price.

General Conditions: The Summit Fire Protection General Conditions attached to this Proposal are a part of this Proposal. Upon acceptance of this Proposal by Owner, the General Conditions will be a part of the contract between Summit Fire Protection and Owner.

SUMMIT FIRE PROTECTION CO.

By: *Chris Gillen*
Sign Name

Chris Gillen
Print Name

CORPORATE:
575 MINNEHAHA AVENUE W
ST. PAUL, MN 55103
TEL (651) 251-1880
FAX (651) 251-1879

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ST. CLOUD, MN 56387
TEL (320) 257-6390
FAX (320) 257-6392

SUMMIT FIRE PROTECTION CO. PROPOSAL AND CONTRACT GENERAL CONDITIONS

These General Conditions are attached to and made a part of the Summit Fire Protection Co. Proposal and Contract to which they are attached (the "Contract") as if fully set forth on the front page of the Contract. As used in these General Conditions, "Summit Fire Protection," "Owner," "Project," and "Contract Price" shall have the same meanings as those terms have in the Proposal.

1. Payment. Owner agrees to pay the Contract Price for the Project as and when required in the Proposal.

2. Changes. Except for substitutions, as described below in this paragraph, any alteration or modification to the Project must be documented and approved by Summit Fire Protection and Owner by a written change order signed by Summit Fire Protection and Owner. Summit Fire Protection reserves the right to require Owner to pay for all change order items (labor, equipment and any other materials) at the time of signing the change order. In the event of discontinuations, changes or the unavailability of specific equipment or materials described in the Specifications, Summit Fire Protection will have the right to substitute equipment and materials with substantially similar quality and features; provided, however, that if the replacement items are more expensive, then Summit Fire Protection shall notify Owner and Owner may elect whether to pay the additional expense (as an increase to the Contract Price) or to modify the Proposal to include less expensive items, if available, that would not increase the Contract Price.

3. Limited Warranty. All materials and labor supplied by Summit Fire Protection will be warranted for one (1) year from the date of completion of the Project. Upon request, Summit Fire Protection will supply a signed warranty letter to Owner, which states the completion date of the Project and the warranty termination date. Certain equipment may include manufacturer's warranties. Summit Fire Protection provides no additional warranty on such equipment. Owner shall have the right to seek enforcement of any such manufacturer's warranty. Summit Fire Protection shall have no obligation to seek enforcement of any such manufacturer's warranty against the manufacturer. Any labor or other services requested by Owner of Summit Fire Protection in connection with Summit Fire Protection's warranty after the one year warranty termination date shall be paid by Owner to Summit Fire Protection based on Summit Fire Protection's standard fees and charges at the time. No other express or implied warranties are made by Summit Fire Protection. Summit Fire Protection does not warrant the Project from normal wear or use. Summit Fire Protection's warranty shall not apply with respect to misuse, abuse or any use that is not in conformity with all applicable specifications and instructions.

4. Unavoidable Delays. To the extent any time period for performance by Summit Fire Protection applies, Summit Fire Protection shall not be responsible for any delays due to federal, state or municipal actions or regulations, strikes or other labor shortages, equipment or other materials delays or shortages, acts or omissions of Owner, or any other events or causes beyond the control of Summit Fire Protection.

5. Access. Owner shall allow Summit Fire Protection to have reasonable access to the job site to allow the completion of the Project on the dates and at the times requested by Summit Fire Protection personnel.

6. Risk of Loss. Risk of loss shall pass to Owner at the time the equipment and other materials that are part of the Project are delivered to the job site. This means that, for example, in the event of damage or destruction due to casualty, or in the event of theft, Owner shall be responsible for payment for such equipment and materials even if the Project has not been completed. Title to the equipment and other materials shall be held by Summit Fire Protection until payment in full of the Contract Price, at which time title shall pass to Owner. Summit Fire Protection shall have the right to remove the equipment and other materials that are a part of the Project if payment of the full Contract Price is not made by Owner immediately upon completion of the Project. That right shall be in addition to, and not in limitation of, Summit Fire Protection's other rights and remedies.

7. Limitation of Remedies. The Project is not an insurance policy or a substitute for an insurance policy. In the event of any breach, default or negligence by Summit Fire Protection under this Contract, Owner agrees that the maximum liability of Summit Fire Protection shall not exceed an amount equal to the Contract Price. Owner expressly waives any right to make any claim in excess of that amount. Further, Owner waives any right to any claims for punitive, exemplary or consequential damages. Owner shall provide Summit Fire Protection with reasonable notice of any claim and a reasonable opportunity to cure the alleged breach or default. Owner shall indemnify, defend and hold Summit Fire Protection harmless from and against claims, actions, costs and expenses, including reasonable legal fees and costs, arising out of any injury, death or damage occurring on or about the job site unless caused by the gross negligence or willful misconduct of Summit Fire Protection.

8. Owner's Failure to Pay. If Owner fails to pay any amount due to Summit Fire Protection as and when required, Summit Fire Protection shall have the right, but not the obligation, to immediately stop work on the Project and Summit Fire Protection may pursue any and all available remedies, including the right to place a lien against the job site. In addition, Owner shall be obligated to reimburse Summit Fire Protection for reasonable legal fees and costs incurred by Summit Fire Protection in the enforcement of this Contract.

9. **Miscellaneous. The headings used herein are for convenience only and are not to be used in interpreting this Contract. This Contract shall be construed, enforced and interpreted under the laws of the State of Minnesota. Jurisdiction and venue for the interpretation and enforcement of this Contract shall be solely in the courts of the State of Minnesota located in Ramsey County, Minnesota. Each party waives the right to a jury trial. This Contract may not be modified, amended or changed orally, but only by an agreement in writing signed by the parties hereto. Neither party shall be deemed to have waived any rights under this Contract unless such waiver is given in writing and signed by such party. If any provision of this Contract is invalid or unenforceable, such provision shall be deemed to be modified to be within the limits of enforceability or validity, if feasible; however, if the offending provision cannot be so modified, it shall be stricken and all other provisions of this Contract in all other respects shall remain valid and enforceable. This Contract is not assignable by Owner. This Contract is the entire agreement between the parties regarding the subject matter of this Contract; any prior or simultaneous oral or written agreement regarding the subject matter hereof is superseded by this Contract.**

OWNER ACCEPTANCE OF PROPOSAL

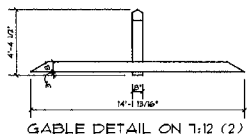
Summit Fire Protection's Proposal is hereby accepted and agreed to by Owner. Owner acknowledges that Owner received and read the Proposal and the attached General Conditions. Upon acceptance by Owner, this Proposal, along with the attached General Conditions, will be a binding contract between Summit Fire Protection and Owner.

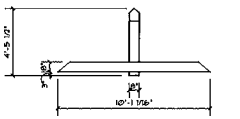
Owner Signature:_____

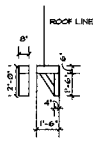
Print Name: _____

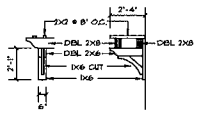
Date: _____

BUILDING SET

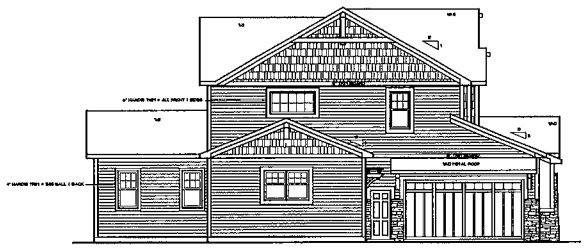




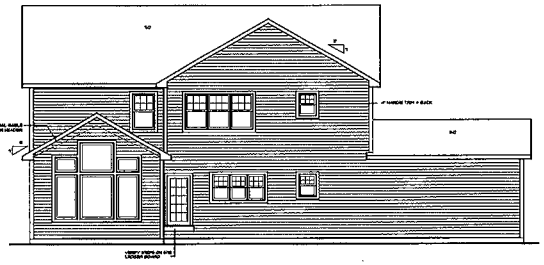




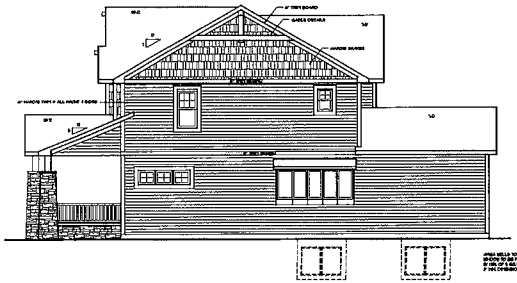
1 FRONT ELEVATION
SCALE: 1/8" = 1'-0"



2 LEFT ELEVATION
SCALE: 1/16" = 1'-0"



3 REAR ELEVATION
SCALE: 1/16" = 1'-0"



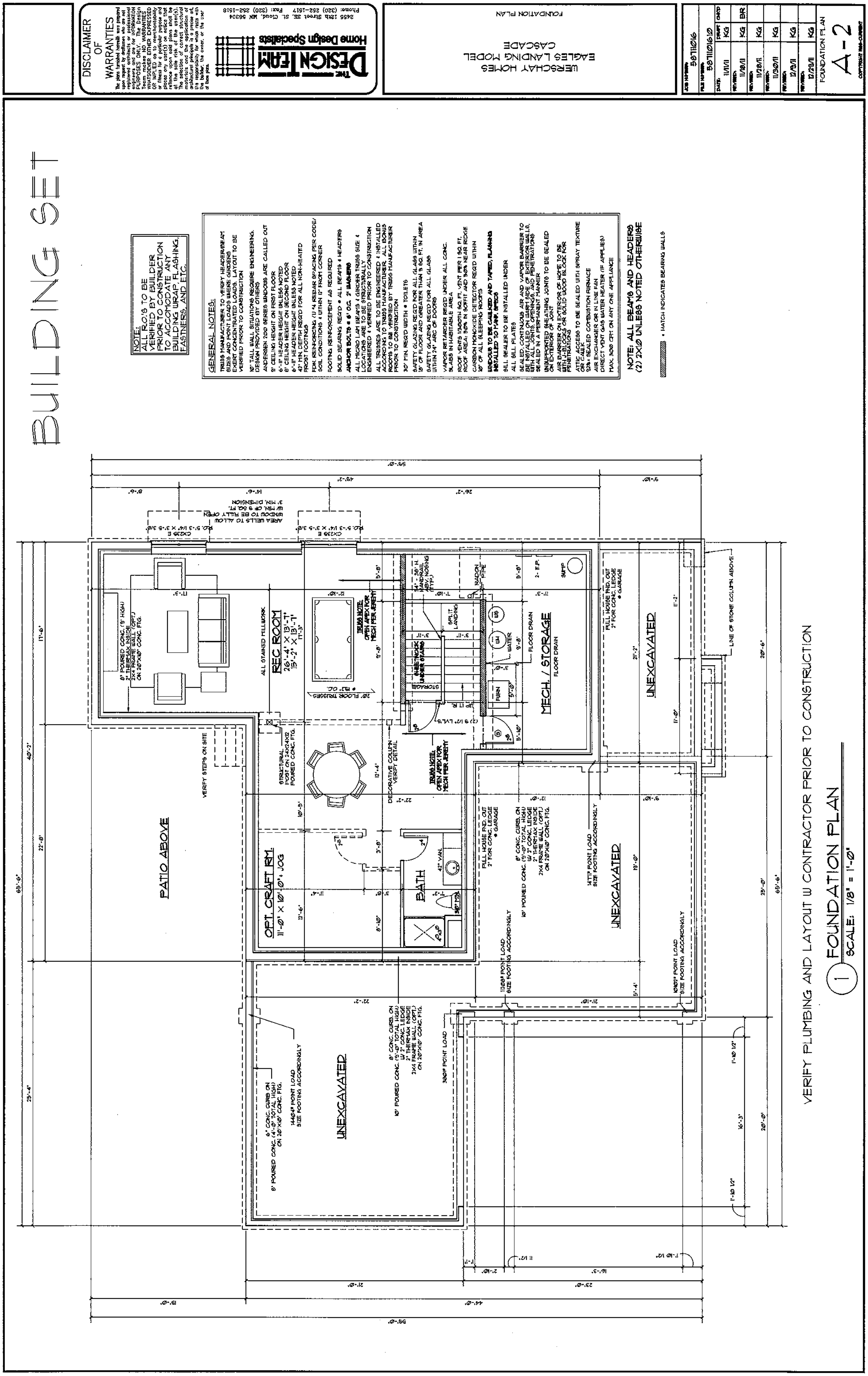
4 RIGHT ELEVATION
SCALE: 1/16" = 1'-0"

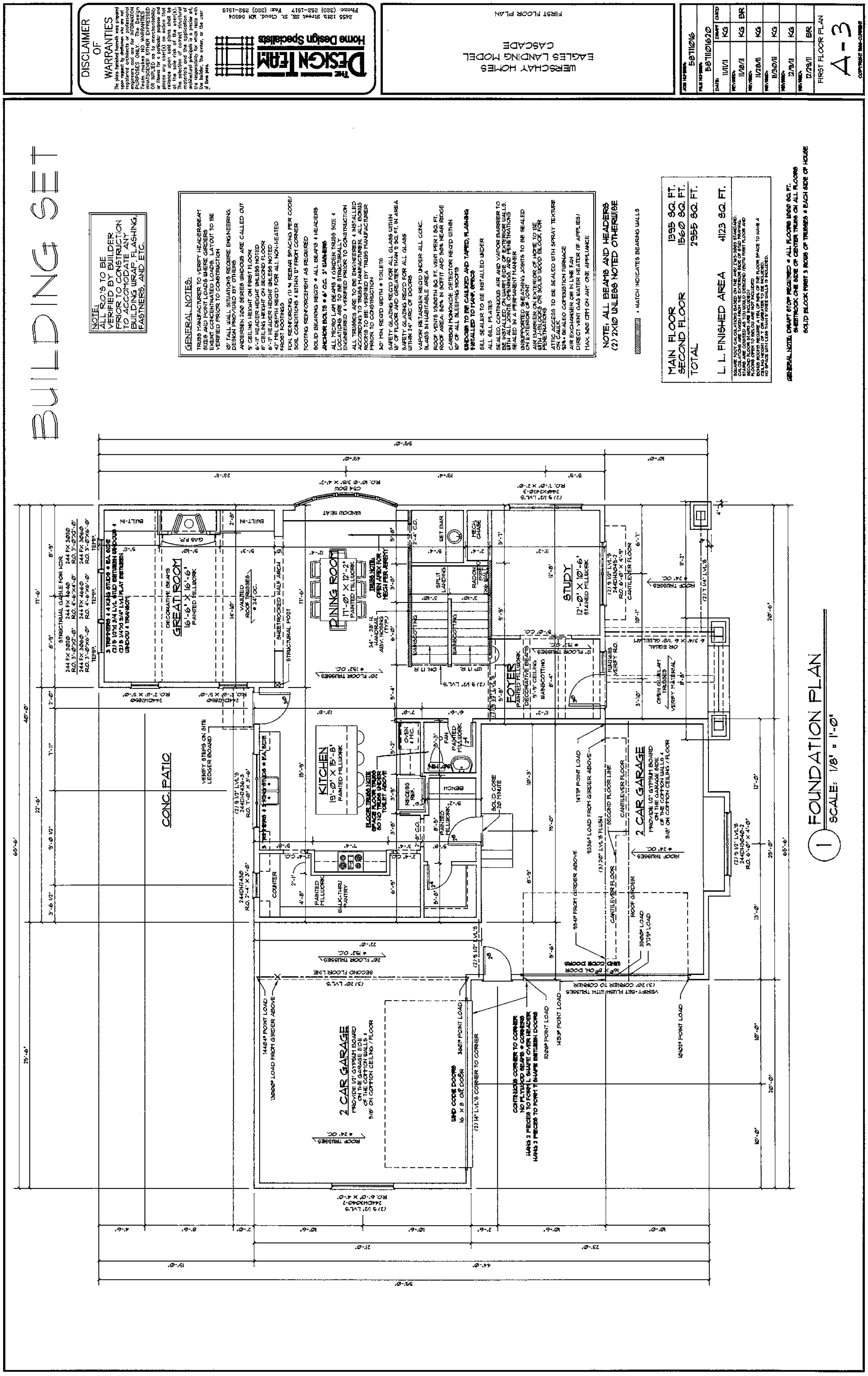
The DESIGN TEAM
Home Design Specialists
2455 12th Street, STE. 3A, Cloud, MN 56304
Phone: (320) 252-1517 Fax: (320) 252-1519

WERSCHAY HOMES
EAGLES LANDING MODEL
CASCADE
ELEVATIONS

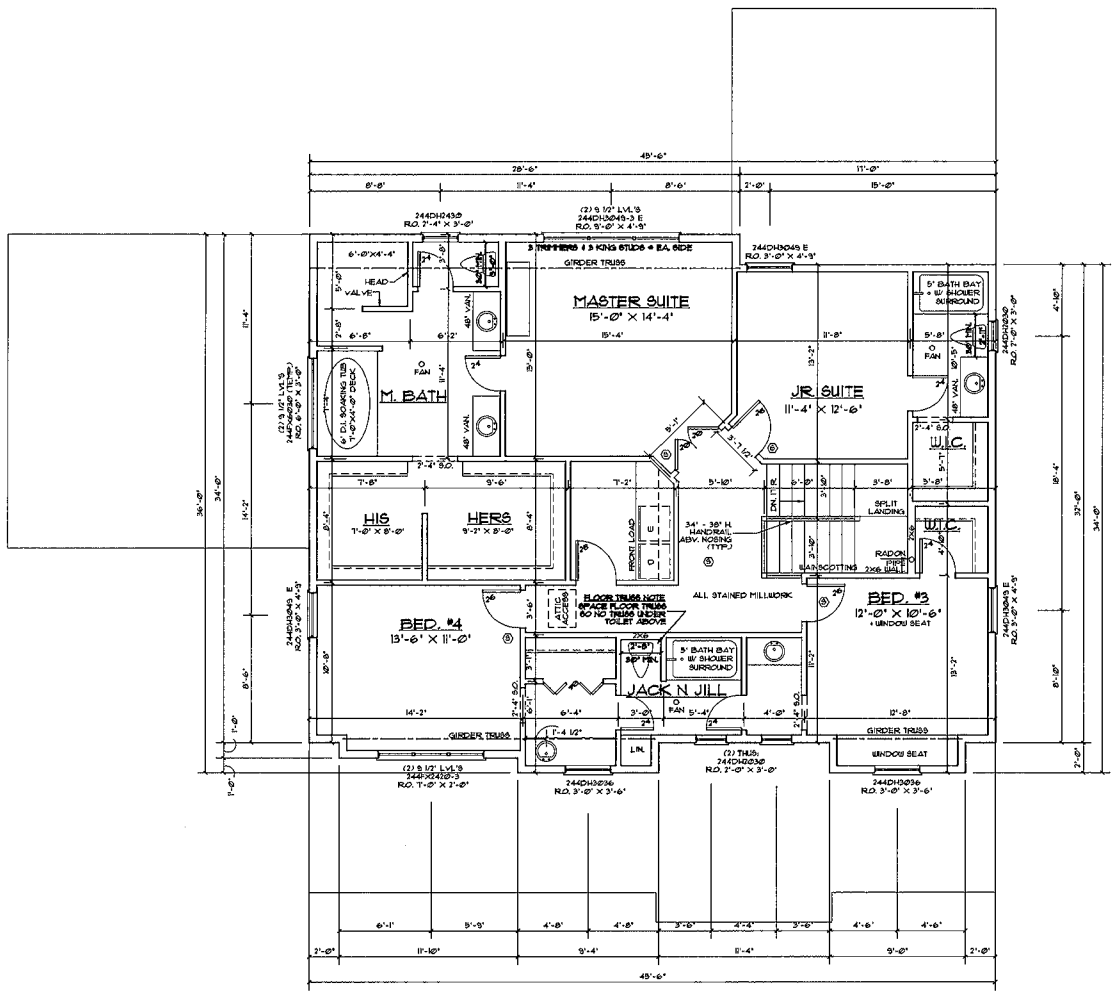
JOB NUMBER:	B8711016	
FILE NUMBER:	B8711016Z0	
DATE: 11/1/11	DRAWN: KG	CHKD:
REVISED: 11/8/11	KG	BR
REVISED: 11/28/11	KG	
REVISED: 11/30/11	KG	
REVISED: 12/9/11	KG	
REVISED: 12/23/11	AD	

ELEVATIONS
A-1


DISCLAIMER OF WARRANTIES
The Design Team Home Design Specialists
WERSCHAY HOMES
EAGLES LANDING MODEL
CASCADE
FOUNDATION PLAN
BUILDING SET
GENERAL NOTES:
NOTE: ALL BEAMS AND HEADERS (2) 2X10 UNLESS NOTED OTHERWISE
REC ROOM
MECH. / STORAGE
UNEXCAVATED
PATIO ABOVE
OPT. CRAFT RM.
BATH
FOUNDATION PLAN
SCALE: 1/8" = 1'-0"
VERIFY PLUMBING AND LAYOUT W CONTRACTOR PRIOR TO CONSTRUCTION
A-2


DISCLAIMER OF WARRANTIES
The DESIGN TEAM
Home Design Specialists
WERSCHAY HOMES
EAGLES LANDING MODEL
CASCADE
FIRST FLOOR PLAN
A-3
BUILDING SET
NOTE: ALL R.O.'S TO BE VERIFIED BY BUILDER PRIOR TO CONSTRUCTION TO ACCOMODATE ANY BUILDING WRAP, FLASHING, FASTNERS, AND ETC.
GENERAL NOTES:
NOTE: ALL BEAMS AND HEADERS (2) 2X10 UNLESS NOTED OTHERWISE
MAIN FLOOR 1395 SQ. FT.
SECOND FLOOR 1560 SQ. FT.
TOTAL 2955 SQ. FT.
L. L. FINISHED AREA 4123 SQ. FT.
GREAT ROOM 16'-6" X 16'-6"
DINING ROOM 11'-0" X 12'-2"
STUDY 12'-0" X 10'-6"
FOYER
KITCHEN 13'-0" X 15'-8"
CONC. PATIO
2 CAR GARAGE
2 CAR GARAGE
FOUNDATION PLAN
SCALE: 1/8" = 1'-0"

BUILDING SET



1 SECOND FLOOR PLAN
SCALE: 1/8" = 1'-0"

NOTE:
ALL R.O.'S TO BE VERIFIED BY BUILDER PRIOR TO CONSTRUCTION TO ACCOMODATE ANY BUILDING WRAP, FLASHING, FASTNERS, AND ETC.

GENERAL NOTES:

TRUSS MANUFACTURER TO VERIFY HEADER/BEAM SIZES AND POINT LOADS WHERE GIRDERS EXERT CONCENTRATED LOADS. LAYOUT TO BE VERIFIED PRIOR TO CONSTRUCTION.

10' TALL WALL SITUATIONS REQUIRE ENGINEERING. DESIGN PROVIDED BY OTHERS

ANDERSEN 200 SERIES WINDOWS ARE CALLED OUT

9' CEILING HEIGHT ON FIRST FLOOR
6'-11" HEADER HEIGHT UNLESS NOTED
9' CEILING HEIGHT ON SECOND FLOOR
6'-11" HEADER HEIGHT UNLESS NOTED
42" MIN. DEPTH REQ'D FOR ALL NON-HEATED FROST FOOTINGS

FDN. REINFORCING (1) #4 REBAR SPACING PER CODE/ SOIL CONDITIONS & WITHIN 12" FROM CORNER

FOOTING REINFORCEMENT AS REQUIRED

SOLID BEARING REQ'D @ ALL BEAMS & HEADERS

ANCHOR BOLTS @ 6' O.C. & 1" WASHERS

ALL MICRO LAM BEAMS & GIRDER TRUSS SIZE & LOCATIONS ARE TO BE STRUCTURALLY ENGINEERED & VERIFIED PRIOR TO CONSTRUCTION

ALL TRUSSES ARE TO BE ENGINEERED & INSTALLED ACCORDING TO TRUSS MANUFACTURER. ALL BONUS ROOMS TO BE VERIFIED BY TRUSS MANUFACTURER PRIOR TO CONSTRUCTION.

36" MIN. REQ'D WIDTH @ TOILETS

SAFETY GLAZING REQ'D FOR ALL GLASS WITHIN 18" OF FLOOR AND GREATER THAN 9 SQ. FT. IN AREA

SAFETY GLAZING REQ'D FOR ALL GLASS WITHIN 24" ARC OF DOORS

VAPOR RETARDER REQ'D UNDER ALL CONC. SLABS IN HABITABLE AREAS

ROOF VENTS 1/300TH SQ. FT. VENT PER 1 SQ. FT. ROOF AREA: 50% IN SOFFIT AND 50% NEAR RIDGE

CARBON MONOXIDE DETECTOR REQ'D WITHIN 10' OF ALL SLEEPING ROOMS

WINDOWS TO BE CAULKED AND TAPED, FLASHING INSTALLED TO MANF. SPECS

SILL SEALER TO BE INSTALLED UNDER ALL SILL PLATES

SEALED, CONTINUOUS AIR AND VAPOR BARRIER TO BE INSTALLED ON WARM SIDE OF EXTERIOR WALLS, WITH ALL JOINTS, OPENINGS, AND PENETRATIONS SEALED IN A PERMANENT MANNER

UNSUPPORTED SHEATHING JOINTS TO BE SEALED ON EXTERIOR OF JOINT

AIR BARRIER ON EXTERIOR OF HOME TO BE WITH J-BLOCKS OR SOLID WOOD BLOCK FOR PENETRATIONS

ATTIC ACCESS TO BE SEALED WITH SPRAY TEXTURE OR CAULK

92% + SEALED COMBUSTION FURNACE

AIR EXCHANGER OR IN LINE FAN

DIRECT VENT GAS WATER HEATER (IF APPLIES)

MAX. 300 CFM ON ANY ONE APPLIANCE

NOTE: ALL BEAMS AND HEADERS (2) 2X10 UNLESS NOTED OTHERWISE

MAIN FLOOR	1395 SQ. FT.
SECOND FLOOR	1560 SQ. FT.
TOTAL	2955 SQ. FT.
L. L. FINISHED AREA	+1123 SQ. FT.

SQUARE FOOT CALCULATIONS BASED ON THE AHN EWB-2005 STANDARD. CALCULATIONS ARE TAKEN FROM THE EXTERIOR SIDE OF STUD FRAMING. STAIRS ARE COUNTED AS YOU WOULD STEP ON THEM (BOTH FIRST FLOOR AND SECOND FLOOR STAIRS ARE INCLUDED) FLOORS OPEN TO BELOW ARE NOT INCLUDED BONUS ROOMS REQUIRE A MIN. OF 50% OF THE FLOOR SPACE TO HAVE A CEILING HEIGHT OF 7' OR GREATER TO BE INCLUDED. NO SPACE WITH LESS THAN 5' KNEE WALLS IS INCLUDED.

GENERAL NOTE: DRAFT STOP REQUIRED @ ALL FLOORS 1000 SQ. FT.
SHEETROCK ONE SIDE OF CENTER TRUSS ON ALL FLOORS
SOLID BLOCK FIRST 3 ROWS OF TRUSSES @ EACH SIDE OF HOUSE

DISCLAIMER OF WARRANTIES

The plans furnished herewith were prepared upon request by draftsmen who are not registered architects or professional engineers and are for INFORMATION PURPOSES ONLY. The Design Team makes NO WARRANTIES WHATSOEVER, EITHER EXPRESSED OR IMPLIED as to merchantability or fitness for a particular purpose and places any user(s) on notice that reliance upon said plans shall be at the sole risk of the user(s). The selection of correct structural materials and the application of architectural principals is a precise art, the responsibility for which rests with the builder, the owner, or the user of these plans.

The Design Team
Home Design Specialists
2455 12th Street SE, St. Cloud, MN 56304
Phone: (320) 253-1577 Fax: (320) 253-1518

WERSCHAY HOMES
EAGLES LANDING MODEL
CASCADE

SECOND FLOOR PLAN

JOB NUMBER: 58711016		
FILE NUMBER: 58711101620		
DATE: 11/11/11	DRAFT: KG	CHKD:
REVISED: 11/28/11	KG	BR
REVISED: 11/28/11	KG	
REVISED: 11/30/11	KG	
REVISED: 12/9/11	KG	
REVISED: 12/29/11	KG	

SECOND FLOOR PLAN
A-4

LIFESAVER FIRE PROTECTION

Sprinkler Installation & Service • Est. 1991

Proposal

PRESENTED BY SEAN SABERY
MAIN 763-473-9010
FAX 763-475-9076
CELL 612-990-7930
PO BOX 583533 MINNEAPOLIS, MN 55458

PRESENTED TO:	DATE:
Jon Peterson Hans Hagen Homes	11-3-10
PHONE: FAX: CELL: 763-586-7200	JOB NAME: d, Wayzata MN
ADDRESS: 941 N.E. Hillwind Rd. Suite 300 Fridley, MN 55432	JOB LOCATION: Wayzata MN

Dear John,

We appreciate the opportunity to work with you on this project! Lifesaver Fire Protection proposes the following work based on the information that was provided:

Scope:
Installation of new sprinkler system per City of Wayzata regulations, NFPA 7, 2002 & NFPA 20, 2007 guidelines, and the State of Minnesota.

Per plans dated 9-25-07
(1) Wet-Type System
Builder to supply soffits in attic for pipes to run in heated attic space as required
Concealed Heads

Design, Engineering and Permits:
Lifesaver Fire Protection shall complete working drawings per NFPA guidelines prior to fabrication of materials and submit plans for permitting. All applicable permit fees have been included.

Price:
The budget price for the above-specified work including general consulting, design, engineered drawings, submittals to state, permit fees, materials, and labor is $9,600.

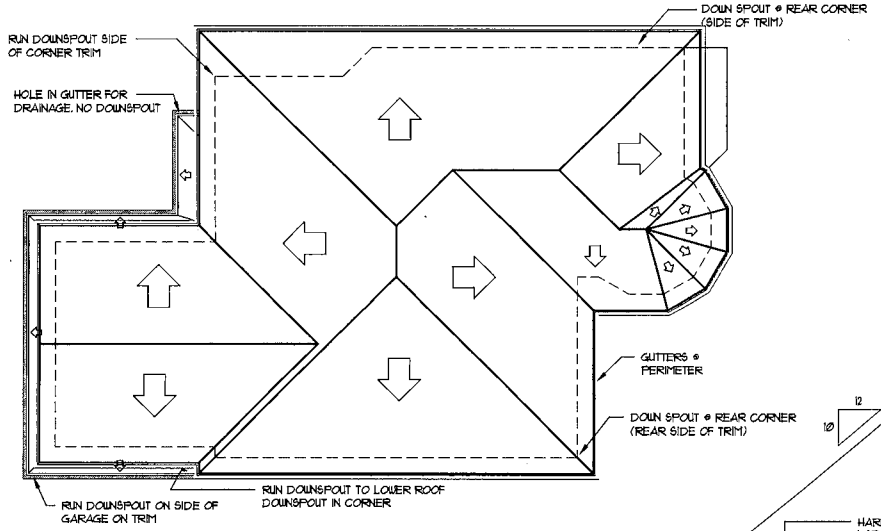
Proposal Date: November 3, 2010
By:

and

Lifesaver Fire Protection
This proposal will remain in effect for 20 days.

Accepted this Day
By:

Name **Title**



ROOF/GUTTER PLAN

SCALE 1/4"=1'-0"

COLOR SELECTIONS

FRONT DOOR: TEAK CUSTOM DOOR ???
XXXX
DOOR FRAME: CLAD
XXXX
GARAGE DOOR: BY BUYER
XXXX
TRIM AND STOP:
XXXX
WINDOWS: -ANDERSEN-
WHITE
FLASHING: DRIP CAP
XXXX
ADDRESS STONE:
XXXX
GUTTERS:
WHITE
DOWNSPOUTS:
XXXX

NOTE: HOME OWNER / LANDSCAPER-

TO PREVENT MOISTURE PROBLEMS, FINAL GRADE SHOULD BE HELD 6" BELOW THE TOP OF THE FOUNDATION. THE FINAL GRADE SHOULD NOT BE PUSHED UP MORE THAN 2" ABOVE THE BOTTOM OF THE FIRST COURSE OF BRICK.

HHH REQUIRES A TAPERED DRIVEWAY ON ALL 3RD STALL GARAGES, DRIVEWAY TO BE CUT BACK TO 20' AT THE CURB LINE.

FINAL PLANS 7-21-2011

NOTICE

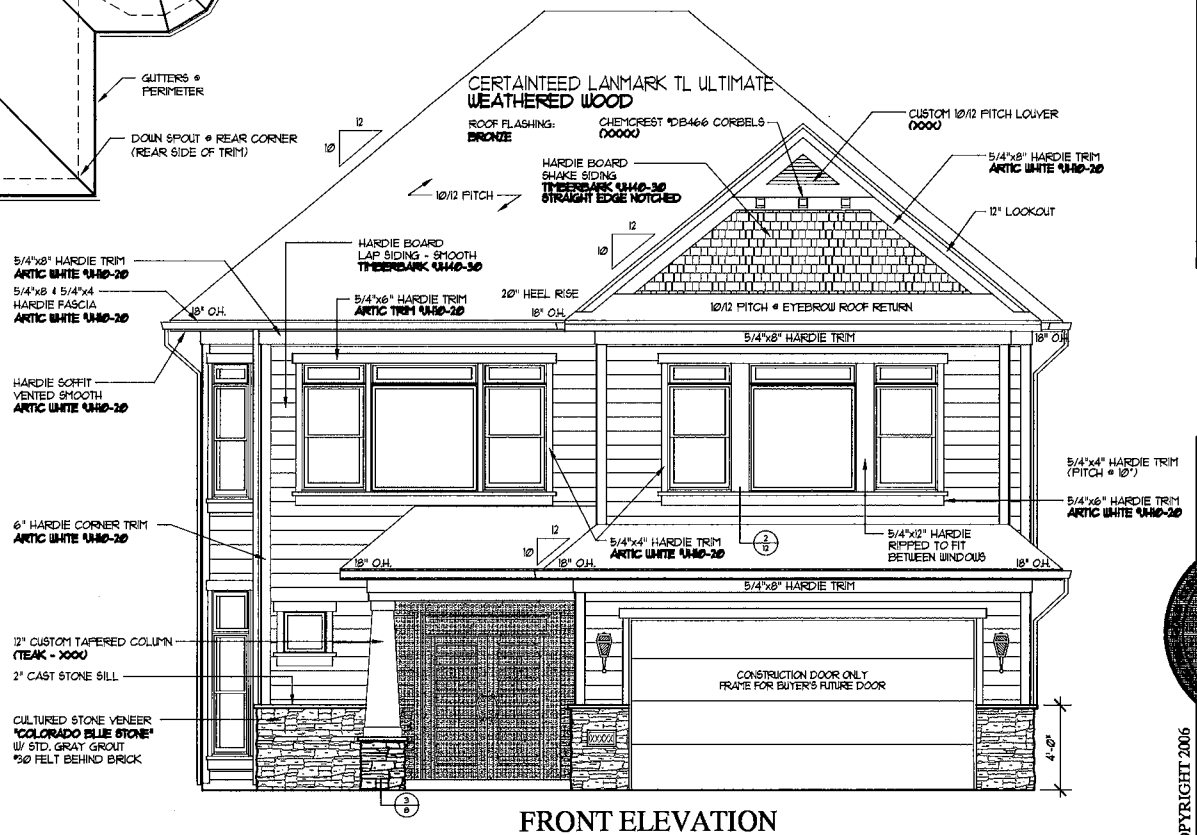
Buyer accepts all the specifications and all provisions in the Purchase & Construction Agreement, Work Order, Final Specifications, Decorator Sheets and final plans and Buyer's home will be built according to these documents.

If Buyer decides to make a change after the Final Plan Review, the processing fee is $750 for a Structural Change, $300 for a non Structural Change, plus additional costs as stated in Work Order paragraph "Changes After Final Plan Review."

Buyer Signature: _____

_____

Hans Hagen Homes: _____
Representative



FRONT ELEVATION

SCALE 1/4"=1'-0"

GENERAL NOTES:

- 10/12 ROOF PITCH W/ 18" O.H. TYP. WHERE NOTED
- 20" HEEL RISE @ THE HOUSE
- XX" HEEL RISE @ THE GARAGE (10/12 PITCH)
- CAULK & FLASH ALL EXTERIOR OPENINGS
- ROOF HATS TO THE REAR

LAST REVISED
P.C. CHANGES 7-21-2011 (NN)
DEC. CHANGES XX-XX-XX
FINAL PLAN REVIEW XX-XX-XX
FINAL RED LINES XX-XX-XX

JOB#: 102

BUYER:

DRAWN BY: NN

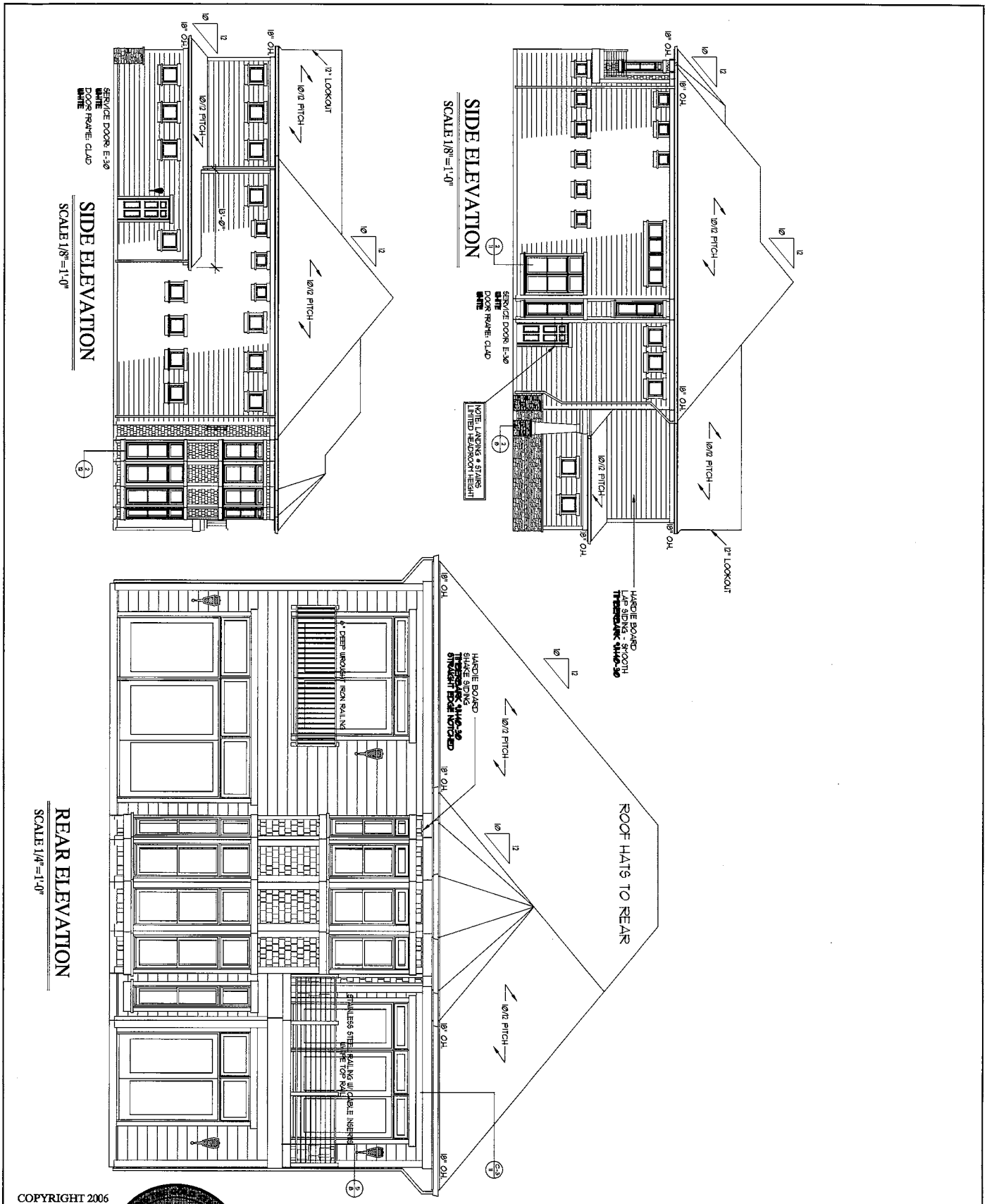
DATE: 9-25-07

LOT: 4

BLOCK:

ADDITION:

PAGE 1 OF 14



PAGE 2 OF 14

BUYER: }

DRAWN BY: NN

DATE: 9-25-07

LOT: 4

BLOCK:

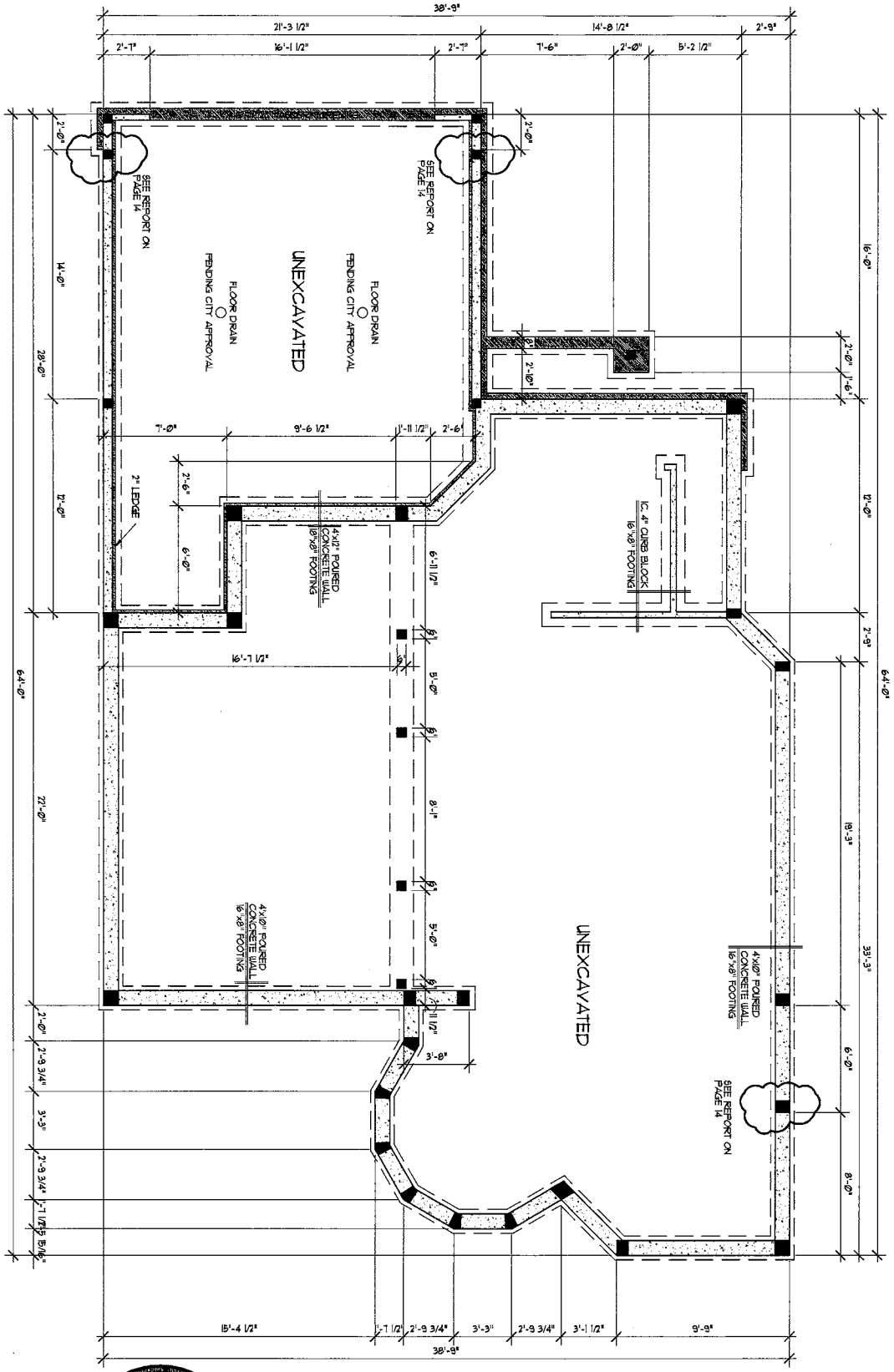
ADDITION:

JOB#: 102

LAST REVISED
P.C. CHANGES 7-21-2011 (NN)
DEC. CHANGES XX-XX-XX
FINAL PREP XX-XX-XX
FINAL REDLINES XX XX-XX-XX

GENERAL NOTES:

* 10/12 ROOF PITCH W/ 18" O.H. TYP. WHERE NOTED
* 20" HEEL RISE @ THE HOUSE
* XX" HEEL RISE @ THE GARAGE (10/12 PITCH)
* CAULK & FLASH ALL EXTERIOR OPENINGS
* ROOF HATS TO THE REAR



PAGE 3 OF 14

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LOT: 4

BLOCK:

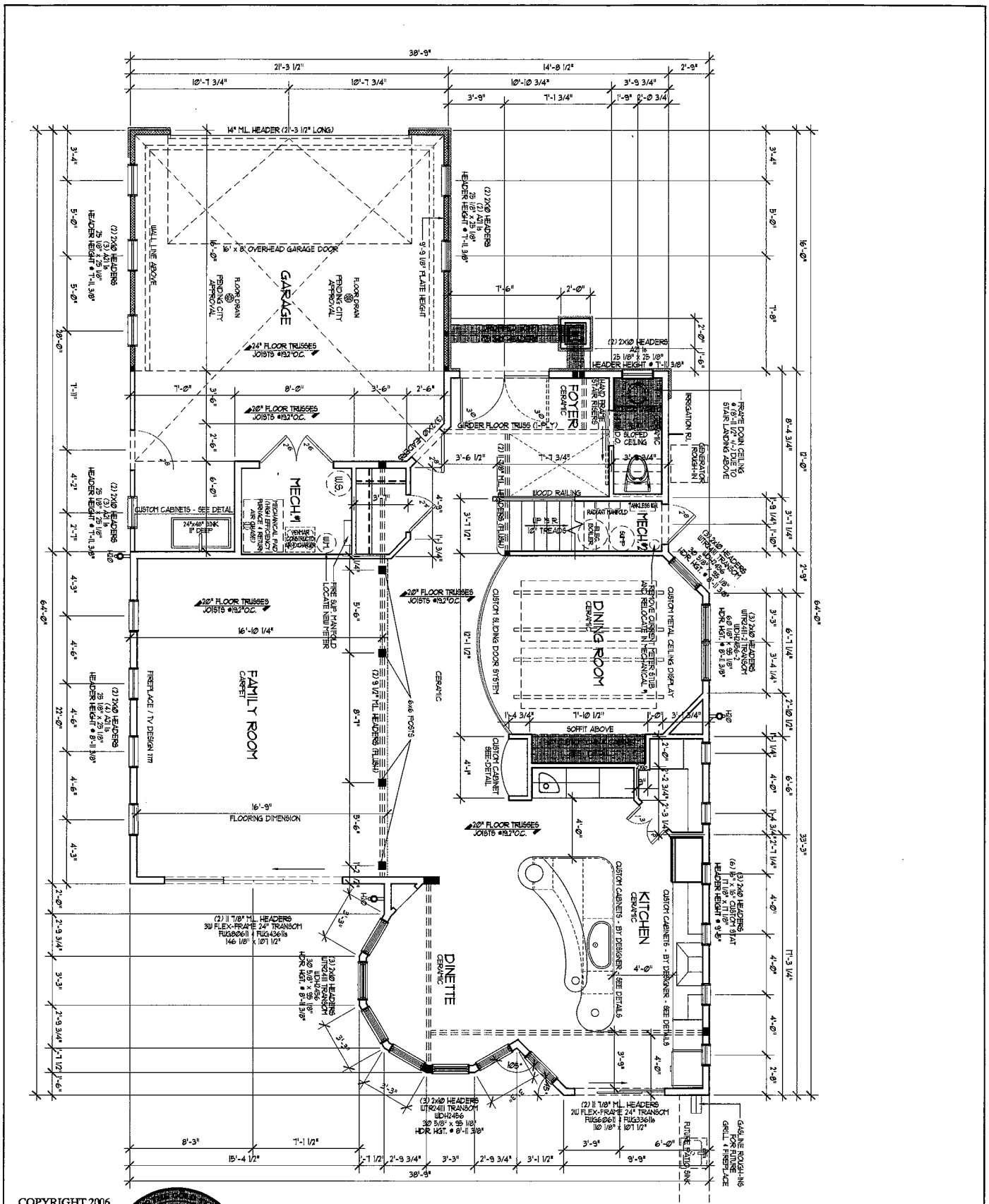
ADDITION

JOB#: 102

LAST REVISED
P.C. CHANGES 7-21-2011 (NN)
DEC. CHANGES XX-XX-XX
FINAL PREP XX-XX-XX
L REDLINES XX-XX-XX

GENERAL NOTES:

* 8' POURED FOUNDATION WALLS
* SEE DETAIL PAGE FOR SILL DETAIL



PAGE 4 OF 14

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BLOCK:

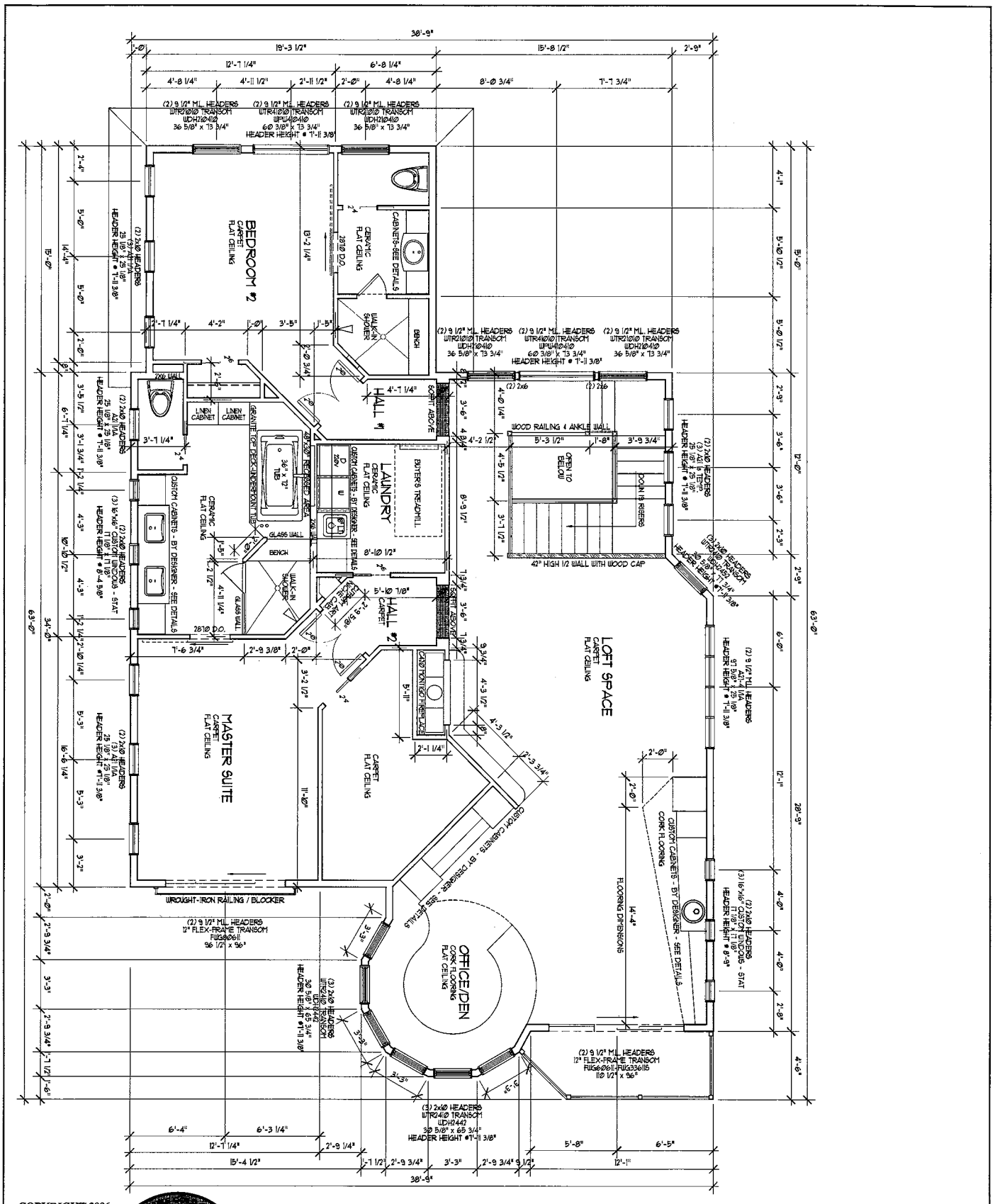
ADDITION

JOB#: 102

LAST REVISED
P.C. CHANGES 7-21-2011 (NN)
DEC. CHANGES XX-XX-XX
FINAL PREP XX-XX-XX
FINAL REDLINES XX-XX

GENERAL NOTES:

* 10'-1 1/8" MAIN FLOOR CEILING HEIGHT
* 8'-11 3/8" WINDOW HEADER HEIGHT



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BLOCK:

ADDITION

LAST REVISED
P.C. CHANGES 7-21-2011 (NN)
DEC. CHANGES XX-XX-XX
FINAL PREP XX-XX-XX
FINAL REDLINES XX XX-XX-XX

GENERAL NOTES:

* 9'-1 1/8" SECOND FLOOR CEILING HEIGHT
* 7'-11 3/8" WINDOW HEADER HEIGHT - UNLESS NOTED OTHERWISE