



**AGENDA FOR  
CITY COUNCIL WORKSHOP**  
*Council Chambers*  
401 E Third Street  
Kewanee, Illinois 61443  
**Special Meeting** – Workshop.  
**Open Meeting** starting at 6:00 p.m.  
**Monday, May 16, 2022**

Posted by 6:00 p.m., May 13, 2022

1. Budget Work Session to Review changes and Potential Capital Expenditures and increases in Operating Expenses in the General Fund, Economic Development, and Enterprise Funds.
2. Adjournment

## Changes to Budget

All changes requested during budget workshop

Moved \$200,000 from 52-43-850 to 33-49-850

Moved \$75,000 from 52-43-515 to 33-49-850

Lowered 52-93-571 by \$5,000 to improve accuracy of projection

Lowered 52-93-850 by \$22,000 to improve accuracy

Added \$20,000 to 02-61-930.5 infill development program

Increased 44-84-E-890 (Other Improvements) to \$300,000 to allow for infrastructure improvements

Created then added \$20,000 to 02-61-930.7 aesthetic improvement program

Increased ambulance costs in 01-22-840 to \$395,030. Offset by additional revenue in the same amount.

Increased vehicle costs in 01-21-840 to \$179,601. Offset by additional revenue from loan proceeds of \$183,654.

Non-operating/capital improvement costs included in the proposed budget for each of the three major funds:

General Fund

\$60,000 Transfer to Cemetery for Dump Truck

\$20,000 Tree Removal

\$383,000 SRTS

\$81,300 GEMT Make up for billing

\$395,030 New Ambulances

\$179,601 Police Vehicles

\$54,000 PD Retirement payouts

Water and Sewer Funds are already at surpluses. Capital costs will be evaluated for the purposes of exclusion from operating budget to determine appropriate fund balance amounts for reference. Both funds already exceed minimum fund balance requirements, even with capital expenditures included.



*401 East Third Street Kewanee, Illinois 61443-PHONE (309) 853-1911-FAX (309) 852-0948*

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## STARCOM QUOTE INFORMATION

May 13<sup>th</sup>, 2022

The quotes from Motorola and Supreme Radio for a switch over to Starcom for both the Kewanee Police Department and the Kewanee Fire Department have been included in your packet. The overall cost for the equipment purchases from Motorola totaled \$288,456.52. They applied an almost \$20,000.00 discount for us as they hope to eventually get the rest of Henry County law enforcement and fire departments switched to Starcom.

The 911 Director for Henry County indicated that the costs from Supreme Radio to install the equipment to make the switch should be made by the Henry County ETSB. The 911 Director also stated that the 4 consolettes listed in the Motorola quote for a total of \$38,424.56 would also be paid for by the Henry County ETSB. After applying the 7% discount to the total for the consolettes that Motorola applied to the total quote, Henry County ETSB would be asked to pay \$35,734.84 for the consolettes and \$12,001.29 for the first Supreme Radio quote.

The total cost for the city of Kewanee would then be \$255,811.68. Supreme Radio indicated that we could potentially sell our current handheld radios to other agencies for \$600-\$700 for each police handheld radio and \$1,000-\$1,200 for each fire handheld radio. If we are successfully able to sell the 24 police radios for \$700 each and the 19 fire radios for \$1,200 each, that would provide us with \$39,600.00 in recouped revenue. The potential total net cost for switching to Starcom could then be lowered to \$216,211.68.

Respectfully,

*Nicholas Welgat*

Nicholas Welgat  
Chief of Police



Billing Address:  
KEWANEE, CITY OF  
401 E THIRD ST  
KEWANEE, IL 61443  
US

Quote Date:05/11/2022  
Expiration Date:07/01/2022  
Quote Created By:  
Dave Lander  
Solutions Specialist  
dlander@supremerradio.com  
309-682-0831

End Customer:  
KEWANEE, CITY OF  
Nicholas Welgat  
nwelgat@cityofkewanee.net  
309-853-1911 ext. 254

Contract: 24302 - STARCOM21, IL  
DIT7016660  
Payment Terms:30 NET

Line #	Item Number	Description	Qty	Sale Price	Ext. Sale Price
	APX™ 8000 Series	APX8000			
1	H91TGD9PW6AN	APX 8000 ALL BAND PORTABLE MODEL 2.5	7	\$7,959.01	\$55,713.07
1a	H869BW	ENH: MULTIKEY	7		
1b	QA01648AA	ADD: HW KEY SUPPLEMENTAL DATA	7		
1c	Q806CB	ADD: ASTRO DIGITAL CAI OPERATION	7		
1d	Q361AN	ADD: P25 9600 BAUD TRUNKING	7		
1e	QA00580AA	ADD: TDMA OPERATION	7		
1f	Q58AL	ADD: 3Y ESSENTIAL SERVICE	7		
1g	QA05509AA	DEL: DELETE UHF BAND	7		
1h	QA09008AA	ADD: GROUP SERVICES	7		
1i	QA09001AB	ADD: WIFI CAPABILITY	7		
1j	H38BS	ADD: SMARTZONE OPERATION	7		
1k	QA07682AA	ADD: SMARTCONNECT	7		



Any sales transaction following Motorola's quote is based on and subject to the terms and conditions of the valid and executed written contract between Customer and Motorola (the "Underlying Agreement") that authorizes Customer to purchase equipment and/or services or license software (collectively "Products"). If no Underlying Agreement exists between Motorola and Customer, then Motorola's Standard Terms of Use and Motorola's Standard Terms and Conditions of Sales and Supply shall govern the purchase of the Products.  
Motorola Solutions, Inc.: 500 West Monroe, United States - 60661 ~ #: 36-1115800

Line #	Item Number	Description	Qty	Sale Price	Ext. Sale Price
1l	Q629AH	ENH: AES ENCRYPTION AND ADP	7		
	APX™ 6000 Series	APX6000			
2	H98UCF9PW6BN	APX6000 700/800 MODEL 2.5 PORTABLE	35	\$5,737.62	\$200,816.70
2a	H869BZ	ENH: MULTIKEY	35		
2b	QA01648AA	ADD: HW KEY SUPPLEMENTAL DATA	35		
2c	Q361AR	ADD: P25 9600 BAUD TRUNKING	35		
2d	Q58AL	ADD: 3Y ESSENTIAL SERVICE	35		
2e	QA00580AC	ADD: TDMA OPERATION	35		
2f	QA09008AA	ADD: GROUP SERVICES	35		
2g	QA09001AB	ADD: WIFI CAPABILITY	35		
2h	H38BT	ADD: SMARTZONE OPERATION	35		
2i	QA07682AA	ADD: SMARTCONNECT	35		
2j	Q806BM	ADD: ASTRO DIGITAL CAI OPERATION	35		
2k	Q629AK	ENH: AES ENCRYPTION AND ADP	35		
3	NNTN8863A	CHARGER, SINGLE-UNIT, IMPRES 2, 3A, 100-240VAC, US/NA PLUG	24	\$123.78	\$2,970.72
4	NNTN8897A	CHGR DESKTOP MULTI UNIT IMPRES 2 1 DISPLAY EXT PS US	2	\$867.24	\$1,734.48
5	NNTN8575ABLK	AUDIO ACCESSORY-REMOTE SPEAKER MICROPHONE,IMPRES XE RSM XT CABLE BLACK	19	\$424.16	\$8,059.04
	APX™ Consolette				
6	L37TSS9PW1AN	ALL BAND CONSOLETTTE	4	\$9,606.14	\$38,424.56
6a	G90AC	ADD: NO MICROPHONE NEEDED APX	4		
6b	QA01648AA	ADD: HW KEY SUPPLEMENTAL DATA	4		
6c	GA09008AA	ADD: GROUP SERVICES	4		
6d	GA00580AA	ADD: TDMA OPERATION	4		



Any sales transaction following Motorola's quote is based on and subject to the terms and conditions of the valid and executed written contract between Customer and Motorola (the "Underlying Agreement") that authorizes Customer to purchase equipment and/or services or license software (collectively "Products"). If no Underlying Agreement exists between Motorola and Customer, then Motorola's Standard Terms of Use and Motorola's Standard Terms and Conditions of Sales and Supply shall govern the purchase of the Products.  
Motorola Solutions, Inc.: 500 West Monroe, United States - 60661 ~ #: 36-1115800

Line #	Item Number	Description	Qty	Sale Price	Ext. Sale Price
6e	CA01598AB	ADD: AC LINE CORD US	4		
6f	G51AT	ENH:SMARTZONE	4		
6g	GA05508AA	DEL: DELETE VHF BAND	4		
6h	GA05509AA	DEL: DELETE UHF BAND	4		
6i	G78AR	ADD: 3Y ESSENTIAL SERVICE	4		
6j	L999AG	ADD: FULL FP W/E5/KEYPAD/ CLOCK/VU	4		
6k	G843AH	ADD: AES ENCRYPTION AND ADP	4		
6l	G806BL	ENH: ASTRO DIGITAL CAI OP APX	4		
6m	W969BG	ADD: MULTIKEY OPERATION	4		
6n	G361AH	ENH: P25 TRUNKING SOFTWARE APX	4		
7	HKN6233C	APX CONSOLETTTE RACK MOUNT KIT	4	\$146.00	\$584.00
8	Incentive	Expiration Date: 06/30/2022	1	-\$19,846.05	-\$19,846.05

**Grand Total** **\$288,456.52(USD)**

### Notes:

- Unless otherwise noted, this quote excludes sales tax or other applicable taxes (such as Goods and Services Tax, sales tax, Value Added Tax and other taxes of a similar nature). Any tax the customer is subject to will be added to invoices.





## Purchase Order Checklist

Marked as PO/ Contract/ Notice to Proceed on Company Letterhead  
(PO will not be processed without this)

PO Number/ Contract Number

PO Date

Vendor = Motorola Solutions, Inc.

Payment (Billing) Terms/ State Contract Number

Bill-To Name on PO must be equal to the *Legal* Bill-To Name

Bill-To Address

Ship-To Address (If we are shipping to a MR location, it must be documented on PO)

Ultimate Address (If the Ship-To address is the MR location then the Ultimate Destination address must be documented on PO )

PO Amount must be equal to or greater than Order Total

Non-Editable Format (Word/ Excel templates cannot be accepted)

Bill To Contact Name & Phone # and EMAIL for customer accounts payable dept

Ship To Contact Name & Phone #

Tax Exemption Status

Signatures (As required)

STARCOM21 OVERSIGHT COMMITTEE

SYSTEM ACCESS APPLICATION

**Agency Name:**

**Agency Contact Information:**

**Name:**

**Agency:**

**Address:**

**Telephone #:**

**Alt# or Cell#:**

**Email:**

**Agency's Communication Coordinator:**

**Same Person:** ☐

**Name:**

**Telephone#:**

**Alt# or Cell#:**

**Email:**

This application form is intended to provide the STARCOM21 Oversight Committee, and it's Advisory Subcommittee, with the pertinent information necessary to determine if an agency is eligible to participate on the STARCOM21 network.

The STARCOM21 network offers statewide mobile radio coverage; single county use; local use within a city, village, town or campus; limited use for mutual aid and occasional communications; specialty use for emergency purposes; campus type scenarios; and port or gateway use for specific types of interoperability.

Please answer each applicable section as completely as possible. Once this application has been submitted, per the instructions below, a member of the STARCOM21 team will contact the agency's supervisor or interoperation's coordinator if additional information is required to process the application.

**Application Overview:**

Provide a general description of your intended use and the potential benefits of the STARCOM21 network, i.e. routine public safety communications including daily dispatch, emergency use only, etc.

PLEASE CHECK HERE IF THIS IS AN **ITTF** ONLY APPLICATION ☐

If your agency is applying to use the STARCOM21 network for emergency purposes only (as described in the ITTF User Agreement) please **ONLY** answer the **first four questions**.

**1. Agency Description:** The type of services provided by your agency; your jurisdiction size; number of proposed STARCOM21 mobiles, portables, consoles, control stations, etc. to be used on a daily basis.

**2. Agency Requirements:** Identify your agency's anticipated communication uses, i.e. unit to unit, agency dispatch, dispatched by another agency and roaming requirements.

**3. Local Policies Governing Use:** If your agency has an established tactical interoperability communication plan (TICP) and/or any other locally developed technical and operational policies and procedures that will govern the use of the STARCOM21 radios, please provide a brief description of those documents. (For guidance, refer to Addendum A.)

**4. Equipment:** Provide the manufacturer and model of **each type** of radio you plan to use on the STARCOM21 network. (example: manufacturer – Motorola Solutions; radio make – XTS2500; Radio model – Model 2; console manufacturer / model – Motorola Solutions MCC7500; etc.

**If your agency will be using radio equipment manufactured by a company other than Motorola Solutions, please read and sign Addendum D and include it with your signed STARCOM21 System Access Application.**

TYPE	MANUFACTURER	MAKE	MODEL	QUANTITY
MOBILE				
PORTABLE				
CONSOLE				
VRS				

DOES THIS APPLICATION INCLUDE USING WAVE  
BROADBAND TO BROADBAND  
BROADBAND TO STARCOM21 FREQUENCY

YES ☐ NO ☐  
YES ☐ NO ☐  
YES ☐ NO ☐

**WAVE applicants must sign and date Addendum C, WAVE Support Limitations and Disclaimer.**

**WAVE Application Overview: (if applicable)**

Provide a general description of intended use and the potential benefits of the WAVE Application on the STARCOM21 network, i.e. daily dispatch, emergency only, administrative use only, etc.

**WAVE Equipment:**

TYPE	MANUFACTURER	MAKE	MODEL	QUANTITY
PHONE				
TABLET				
OTHER				

**5. Existing Communication Capabilities:**

Include a description of your current communication capabilities and system. Will those existing systems and capabilities serve as your primary or backup means of communication? Please explain.

**6. Estimated Traffic Counts:**

Provide your best estimate on traffic generated based on your anticipated needs. Identify standards used; per unit per day average, total agency per month, etc.

**7. Emergency Button Activation:**

If the Emergency Alert Button is to be activated, what talk group will be used?

Which agency will monitor that talk group?

## **8. Interoperability Requirements:**

Identify anticipated interoperability requirements: incident based and/or routine in nature? How much radio traffic will be generated? With what agencies? For what purpose? For what duration? What specific talk group(s) you'll want to use from those specific agency(s) etc.

\*\*\*MOU Requirements: Prior to any radio programming a Memorandum of Understanding must be on file with all agencies desiring the sharing of any talk group. (Refer to #5 on the signature page) \*\*\*

## **9. User Classification or Scope of Communication Capabilities:**

Based on the User Classification descriptions below estimate which classification best describes your agency. Provide an estimated breakdown of use of each type of classification. Example: "Based on historical data, we anticipate 95% city wide use with 5% roaming out of our jurisdiction."

### **User Classifications:**

#### **Statewide Use:**

Allows for routine statewide system access.

#### **County Use:**

Users that typically operate within the geographic boundaries of a single designated County. Usage outside the designated County is allowed only for emergency or mutual aid situations.

#### **Local Use:**

Users that typically operate within the jurisdictional boundaries of a City, Village, Town or designated campus type environment. Usage outside the designated boundaries is allowed only for emergency or mutual aid situations.

#### **Limited Use:**

Users that require access on a limited basis for the purpose of mutual aid, interoperability or intermittent operations. May also apply to occasional access to data features, local emergency and event coordination outside of the ITTF program irregular or infrequent use.

#### **Specialty Use:**

Users that require only occasional emergency use of the network or as authorized under agreement with the Illinois Terrorism Task Force (ITTF), IDPH or other entities as approved by the STARCOM21 Oversight Committee and/or its designee and Motorola Solutions.

#### **Campus Use:**

Applies to users with geographically concentrated operations and high User counts. Typical examples include prisons, college campuses or hospitals. Assumes Users will rarely roam off their designated campus. Use of the Campus Use rate is subject to the approval of the STARCOM21 Oversight Committee and/or its designee and Motorola Solutions. Rates



are negotiated on a case-by-case basis and are determined by assessing User operational and technical parameters and will be reviewed by the STARCOM21 Oversight Committee and/or its designee. Rates are memorialized in the State's Basic Ordering Agreement (BOA) for State Agency Users and in User Agreements for non-State Agencies Users.

**Port Access:**

Applies to Users that have unique requirements and do not fit any of the defined rates categories. Typically Port Access will apply to operation on User owned sites connected to the STARCOM21 Network Master Site. Port user fees are negotiated between Motorola Solutions and the applicant Agency(s) on a case-by-case basis. Port access is subject to STARCOM21 Oversight Committee approval and/or its designee.

**Gateway Access:**

There are two types of Gateway Access supported, Traditional Audio Patching and P25 ISSI.

Audio Patching:

Users that require Gateway Access for audio patching that has been approved by the STARCOM21 Oversight Committee and/or its designee will pay a monthly fee for Gateway Use which shall be calculated as follows:

- The base rate shall be equivalent to the Specialty Rate (\$10 per radio per month)
- Usage outside the parameters of the Specialty rate shall be charged airtime as follows:
  - ISR Sites - \$1 per minute/per site (rounded to the nearest minute and billed monthly)
  - Simulcast Sites - \$2.25 per minute/per site (rounded to the nearest minute and billed monthly)

P25 ISSI:

Project 25 (P25) Inter RF Subsystem Interface (P25 ISSI) provides an IP interface for connecting multiple P25 systems together. This will allow users to roam onto other P25 systems providing network-to-network interoperability and will be used as approved by the STARCOM21 Oversight Committee and/or its designee.

- The specific rate structure for P25 ISSI services will be determined when the technology is fully enabled on the STARCOM21 network. An associated Impact Fee and the installation of User purchased infrastructure equipment may also be required to utilize P25 ISSI services.

**Narrative:**

Please include any additional information which may be useful to the members of the Oversight Committee in their consideration of your application.

By signature indicated below; applicant agrees with the seven items listed below and understands the inability to comply with the six items listed below could result in the discontinuation of airtime service on the STARCOM21 network.

Provide all personnel who will be accessing/using STARCOM21 radios with training on the use of the radio equipment and communications procedures. Copies of training syllabus and any materials used; a listing of personnel receiving training; the trainer's name; ID, and employer; and other information/items associated with the training; must be made available to the STARCOM21 Oversight or its Advisory Subcommittee upon request.

1. Adhere to the policies and procedures as defined by the STARCOM21 Oversight Committee.
2. Adhere to the provisions of, and promote utilization of the Statewide Communications Interoperability Plan (SCIP) and participate in the development of your county Tactical Interoperable Communications Plan (TICP).
3. Adhere to policies and procedures of ISPERN, IREACH, and other statewide networks as may be applicable.
4. Include an SIEC approved State Interoperable Template into the programming of all radios intended to be directly interoperable with other agencies, jurisdictions and disciplines on the STARCOM21 platform.

Template to be programmed

Full ITTF Template	<input type="checkbox"/>
3 Zone (BA thru BC)	<input type="checkbox"/>
Single Zone (BA)	<input type="checkbox"/>

5. I agree to acquire Memorandum(s) of Understanding or Letters of Permission from any and all agencies/communities where I plan to add their talkgroup(s) to my STARCOM21 radio(s). I agree to acquire said documentation prior to the development of my template(s) or programming of my radio(s).
6. Improperly used statewide talkgroups are detrimental to the efficient operation of the network. Authorities responsible for the operation of statewide talkgroups must minimize the number and duration of calls on those talkgroups to the extent possible. Every effort should be made to route traffic to regional talkgroups whenever necessary. Broadcast of nuisance radio traffic may result in the removal of the offending radio from the network.
7. Devices utilizing WAVE broadband to STARCOM21 frequencies for interoperability must be the property of the applying agency. Personal devices are prohibited from using the STARCOM21 network with proper documented authority.

I have read and understand the contractual mobile and portable coverage as depicted in the STARCOM21 contract (for guidance, refer to Addendum B).

Signature below must be the Chief Executive Officer of the agency or organization (or designee).

Title:

Signature:

Name (printed):

Date:

**Notice:** Applicant may represent the application at Subcommittee deliberations and may appeal the decision of the Technical Advisory Subcommittee (ADSUB) to the STARCOM21 Oversight Committee. Please sign and return this application to your Motorola Solutions account representative or to: Motorola Solutions Inc., 2100 Progress Parkway, Schaumburg, Illinois 60196 Att: Lisa Wilkins (224) 301-3386 [QR](mailto:lisa.wilkins@motorolasolutions.com) Email this application to [lisa.wilkins@motorolasolutions.com](mailto:lisa.wilkins@motorolasolutions.com)

# **STARCOM21**

## **Standard Operating Procedures**

### **And**

## **Tactical Interoperability Communications Plan Recommendations**

The intent of this document is to provide guidance to STARCOM21 applicants or existing STARCOM21 users.

### Standard Operating Procedure (SOP)

The SOP provides guidelines for the day-to-day use of the radio system by an agency or user.

1. The Starcom21 Radio System is designed to be an interoperable radio system capable of handling the traffic of all approved users. For the system to operate at peak capability through all scenarios, it is imperative for all users to understand the importance of properly training all system users. Since Starcom21 is a shared statewide system in Illinois, it is extremely important to use best practices when using this system. If you need user training assistance, Motorola, ILEAS and IEMA are good resources.
2. Radios should be used for official business only. Radio communications should be in support of the agency or user's core mission.
3. Transmissions on the radio should be kept short and to the point. Only use the airtime needed to clearly communicate the message.
4. Communications should be prioritized according to urgency:
  - a. Emergency
  - b. Officer or User Safety
  - c. Routine Traffic.
5. If a dispatch center is used, clearly define that they are in control of all radio communications. They will handle communications based on #3 (above).
6. The agency/organization should have a defined training plan that will train the users on:
  - a. The correct protocol for radio messages (what to say and how to say it)
  - b. The correct way to operate the radios (functionality of buttons/knobs)
7. If the Emergency Button is used:
  - a. The agency should have a defined policy on how to respond to the emergency button.
  - b. Users should be trained in the use of and the circumstances where the emergency button will be used.
  - c. Emergency buttons should only go to a 7/24 dispatch center
    - i. If dispatch center is NOT used, there must be clear policies on how the emergency button will be used.

### Tactical Interoperability Communications Plan (TICP)

The TICP defines how the agency or organization will communicate with adjoining agencies.

1. Agencies/departments should consult their county TICP, or if that doesn't exist, consult the State TICP
2. If the agency is a part of the county or state TICP, simply follow that document.
3. If not, TICP development consists of the following steps:
  - a. Who do you need to talk to?
  - b. What common resources are in use?
  - c. When will you need to communicate with adjoining agencies
  - d. Define the procedures for the users to follow on the ground.
  - e. Implement any MOU's required for the TICP.

# STARCOM21

## Master Contract #CMS3618850

### 2.2.2.1 Coverage Requirements

**B. Mobile Radio Coverage (outdoor):** Motorola Solutions shall continue to maintain the STARCOM21 System that provides statewide mobile radio coverage for the original 187 RF sites that comprised the STARCOM21 system when the State accepted the System on January 22, 2008 and which provide coverage of the geographic area of the State of Illinois, plus 3 miles beyond the State's jurisdictional border, subject to compliance with the prevailing FCC RCRIC rules. Motorola Solutions will maintain all RF sites in full compliance with Motorola specifications. The delivered audio quality ("DAQ") for the area covered shall be 3.0 or better, as defined in Telecommunications Industry Association ("TIA") report TSB-88A, titled "Wireless Communications Systems, for Technologically-independent Modeling, Simulation, and Verification". Mobile coverage performance shall be equivalent between talk-in (mobile-to-System) and talk-out (System-to-mobile).

Due to the digital nature of the System, no background 'noise' on a non-patched talkgroup call will be heard by the listener from the mobile radio or the radio control console delivered by Motorola Solutions under this Contract.

**C. Portable Radio Coverage (outdoor):** Motorola Solutions shall maintain the STARCOM21 System providing outdoor portable radio coverage, with a Speaker/Microphone/Antenna (SMA) configuration, at an audio quality of DAQ 3.0 or greater. In areas not covered by Attachment C, Section 2.2.2.1 (D), such design may require the use of vehicular repeaters.

**D. Portable Radio Coverage (indoor):** Motorola Solutions shall provide in-building portable coverage at an audio quality of DAQ 3.0 or greater at 95% or better inside the jurisdictional boundaries, with a test confidence level as defined by TSB88 of 99% or better, for the counties of McHenry, Lake, Kane, Cook, DuPage, and Will; and for the cities of Rockford, Moline, East Moline, Kankakee, Peoria, Bloomington/Normal, Champaign/Urbana, Decatur, Springfield, Carbondale, and the East St. Louis metropolitan area. The in-building coverage System design shall be based upon a building penetration loss of 8 dB. (This performance is also similar to that of a portable inside a passenger vehicle.) Motorola Solutions shall provide in-building portable radio coverage and audio quality performance throughout the entire Contract Term. This level of portable in-building radio coverage shall be 95% or better for each region listed above, or that portable in-building coverage level determined through the portable in-building coverage acceptance test performed in the original STARCOM21 Master Contract.

## **Addendum C**



### **STARCOM21 State of Illinois Radio System**

#### **WAVE Support Limitations and Disclaimer**

The STARCOM21 WAVE Application is a hosted, enterprise-grade, broadband push-to-talk (PTT) service that provides real-time, secure communications between groups and individuals using smart devices, PCs, and Land Mobile Radio (LMR) systems. Motorola Solutions offers the following as to the applicable support limitations and disclaimer of liability on these devices and the WAVE service.

- Because Motorola Solutions has no control over third party manufacturers' quality, hardware, or software, any issues the customer experiences with third party manufacturers' devices, including, but not limited to, issues relating to the operation of such devices on the STARCOM21 system must be addressed by the third party radio manufacturer. Motorola Solutions disclaims any liability to customer with respect to devices or equipment produced by third parties.
- Motorola Solutions is not responsible for (a) use or operation of the Software except in accordance with the applicable and current documentation and license rights; (b) errors, omissions, damages or wrongful acts, by an operator, user or third party personnel; (c) repairs, maintenance, alterations, relocation, copying, tampering or other conduct not duly authorized in writing by MSI; (d) operation on or in association with hardware or software not recommended by MSI for the Software; and (e) external causes such as electrostatic or environmental conditions, and accidents including fire, water and lightning. Further, MSI reserves the right to downgrade the Service level of any Customer if, in MSI's opinion, the Customer is abusing the use of the Service support features.
- End user is responsible for services for problems that are subsequently determined by MSI to be not caused by the Software, including problems with carrier or Wi-Fi network or matters generally beyond the control of Motorola Solutions.
- Periodically, Motorola Solutions may perform enhancements or upgrades to the STARCOM21 system. System enhancements or upgrades may be done to address issues, add features to the system, or for other reasons deemed necessary by Motorola Solutions. Motorola Solutions does not guarantee that devices or equipment manufactured by third parties will not be affected by such enhancements or upgrades. Motorola Solutions makes no representations or warrants with respect to: a) support, upgrades, patches or similar fixes, and enhancements to third-party manufactured devices or equipment; and b) notice to third party radio or equipment manufacturers of system enhancements or upgrades.
- If, in Motorola Solutions' opinion, third party devices or equipment adversely impact the STARCOM21 system or system user operations, Motorola Solutions may deactivate such radios or equipment. Motorola Solutions will provide notice of deactivation in a timely manner based on the severity of the situation and the impact to grade of service.
- Motorola Solutions hereby disclaims all warranties and guarantees, express or implied, at law or in equity, in any way related to the use by customer of third-party manufacturers' devices or equipment.

Motorola Solutions values you as a customer and would like to thank you for allowing us to provide your radio service. If you have any questions or concerns please contact your Sales Representative or a STARCOM21 Project Team Member at any time.

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Motorola Solutions Representative      Date

---

Customer Representative      Date

Motorola Solutions Inc., 2100 Progress Parkway, Schaumburg, IL 60196

## **Addendum D**



### **STARCOM21 State of Illinois Radio System**

#### **Non-Motorola Solutions Radio Support Limitations and Disclaimer**

The STARCOM21 State of Illinois radio system is an open system. This means that customers may be able to use other manufacturers' radios on the system. While those radios may work on the system, Motorola Solutions offers the following as to the applicable support limitations and disclaimer of liability.

- Because Motorola Solutions has no control over third party manufacturers' quality, hardware, or software, any issues the customer experiences with third party manufacturers' radios, including, but not limited to, issues relating to the operation of such radios on the STARCOM21 system must be addressed by the third party radio manufacturer. Motorola Solutions disclaims any liability to customer with respect to radios or equipment produced by third parties.
- Periodically, Motorola Solutions may perform enhancements or upgrades to the STARCOM21 system. System enhancements or upgrades may be done to address issues, add features to the system, or for other reasons deemed necessary by Motorola Solutions. Motorola Solutions does not guarantee that radios or equipment manufactured by third parties will not be affected by such enhancements or upgrades. It is the third party radio manufacturers' responsibility to support, upgrade, supply patches or other fixes, and performs all other necessary tasks to ensure proper operation of their products on the STARCOM21 system and it is the customer's responsibility to notify the third party manufacturer of any system enhancements or upgrades affecting such radios or equipment. Motorola Solutions makes no representations or warrants with respect to: a) support, upgrades, patches or similar fixes, and enhancements to third-party manufactured radios or equipment; and b) notice to third party radio or equipment manufacturers of system enhancements or upgrades.
- Motorola Solutions' products may be upgradeable to next generation technology by software flash or other means. This may eliminate the necessity to replace Motorola Solutions products if the system is upgraded to a new technology. Other manufacturers' radios may not have such upgrade capability and Motorola Solutions disclaims any liability for, including but not limited to, operation, upgrades, obsolescence, or other matters relating to third party manufacturers, their radios or equipment, and customer's use thereof.
- If, in Motorola Solutions' opinion, third party radios or equipment adversely impact the STARCOM21 system or system user operations, Motorola Solutions may deactivate such radios or equipment. Motorola Solutions will provide notice of deactivation in a timely manner based on the severity of the situation and the impact to grade of service.
- Motorola Solutions hereby disclaims all warranties and guarantees, express or implied, at law or in equity, in any way related to the use by customer of third-party manufacturers' radios or equipment.
- 

Motorola Solutions values you as a customer and would like to thank you for allowing us to provide your radio service. If you have any questions or concerns please contact your Sales Representative or a STARCOM21 Project Team Member at any time.

---

Motorola Solutions Representative      Date

---

Customer Representative      Date

Motorola Solutions Inc., 2100 Progress Parkway, Schaumburg, IL 60196

# SUPREME RADIO COMMUNICATIONS, INC.

4017 North Prospect Rd  
Peoria Heights, IL 61616  
(309) 682-0831 Fax: (309) 682-5949

## QUOTATION

QUOTE NO.: 46896 - 00 EC

DATE: 5/13/22

TERMS: UPON RECEIPT OF INV

DELIVERY:

KG2611A  
TO: Kewanee, City of  
Attn: Nick Welgat Chief of Police  
401 E. Third Street  
Kewanee, IL 61443

Please reference Quote No. on  
Correspondence & purchase orders.  
Prices firm for 30 days.

WE ARE PLEASED TO QUOTE YOU THE FOLLOWING:

QTY	ITEM	DESCRIPTION	UNIT PRICE	TOTAL
1	SUBSCRIBER PROGRAM	PROGRAMMING PER UNIT	3,000.00	3,000.00
			Item summary	3,000.00
			Subtotal	3,000.00
			Inbound Frt	90.00
			GRAND TOTAL:	3,090.00

ORDERS SUBJECT TO SHIPPING & HANDLING AND SALES TAX IF APPLICABLE

TERMS SUBJECT TO CREDIT REVIEW

BY Dave Lander 147 31

THIS QUOTE IS SUBJECT TO REVIEW BY MANAGEMENT FOR COMPLETENESS AND ACCURACY.

Accepted

by

P.O. No. \_\_\_\_\_

LEGAL NAME OF PURCHASER

Date \_\_\_\_\_

AUTHORIZED SIGNATURE

# SUPREME RADIO COMMUNICATIONS, INC.

4017 North Prospect Rd  
Peoria Heights, IL 61616  
(309) 682-0831 Fax: (309) 682-5949

## QUOTATION

QUOTE NO.: 46887 - 00 EC

DATE: 5/11/22

TERMS: UPON RECEIPT OF INV

DELIVERY:

HG72835  
TO: Henry County ETSB  
Attn: Joe Swan  
Attn: Director Joe Swan  
311 W. Center St.  
Cambridge, IL 61238

Please reference Quote No. on  
Correspondence & purchase orders.  
Prices firm for 30 days.

WE ARE PLEASED TO QUOTE YOU THE FOLLOWING:

QTY	DESCRIPTION	UNIT PRICE	TOTAL
4	ANTENNA 800/900 BASE TYPE	330.66	1,322.64
4	POLYPHASER VHF-800 FEM-FEM BUL	106.08	424.32
400	ANDREW 1/2 IN. COAX	3.20	1,280.00
4	CONNECTOR-N M-1/2" COAX	27.82	111.28
20	ANDREW 1/4 IN. SUPERFLEX COAX	2.07	41.40
8	CONNECTOR-N M-1/4" SUPERFLEX (F1TNM-HC)	27.91	223.28
150	ANDREW 1/4 IN. SUPERFLEX COAX	2.07	310.50
8	CONNECTOR-N M-1/4" SUPERFLEX (F1TNM-HC)	27.91	223.28
4	SHELF, FOR RELAY RACK, GRAY 19 INCH 15 INCH DEEP	125.00	500.00
	Continued on following page		

ORDERS SUBJECT TO SHIPPING & HANDLING AND SALES TAX IF APPLICABLE

TERMS SUBJECT TO CREDIT REVIEW

BY LYLE LITTLE 31

THIS QUOTE IS SUBJECT TO REVIEW BY MANAGEMENT FOR COMPLETENESS AND ACCURACY.

Accepted

by

P.O. No. \_\_\_\_\_

LEGAL NAME OF PURCHASER

Date \_\_\_\_\_

AUTHORIZED SIGNATURE



QTY	DESCRIPTION	UNIT PRICE	TOTAL
1	COAX VAPOR SEAL KIT, 2 ROLLS STICKY TAPE, 1 WIDE, 1 NARROW	37.37	37.37
4	SIDE ARM 24 MTS	225.00	900.00
4	CLAMP KITS, 2 Piece LAIRD	179.73	718.92
16	Lug, #6 One Hole NON-insulated	1.29	20.64
50	GROUND WIRE/6 AWG/GREEN	1.25	62.50
1	DISCOUNT	650.00-	650.00-
1	INSTALL LABOR	6,240.00	6,240.00
		Item summary	11,766.13
		Subtotal	11,766.13
		Inbound Frt	235.16
		Sales Tax	.00
		GRAND TOTAL:	12,001.29

## General Fund Budget Projection Update

Police Revenues: Loan Proceeds:	\$ 183,653.80	- (New Revenue Line)
Police Expenses - Vehicles:	<u>\$ (183,653.80)</u>	- Revised Expense Line
Principal Payments	\$ 40,850.00	- Added to Debt Service Section for Police
Interest Payments	<u>\$ 3,000.00</u>	- Added to Debt Service Section for Police
Net Budget Expense Impact	\$ 43,850.00	
Vehicles - originally budgeted	\$ (50,000.00)	- In previous budget documents
Net change to budgeted expenses	<u><u>\$ (6,150.00)</u></u>	



124 East First Street  
Deer Creek, IL 61733

# Quote

Date	11/18/2021
Quote #	QT1527621
Expires	12/03/2021
Sales Rep	Vulcani, Frank
PO #	air paks budget
Shipping Method	FedEx Ground

## Bill To

Kewanee Fire Dept (IL)  
401 E. Third St.  
Kewanee IL 61443  
United States

## Ship To

Kewanee Fire Dept (IL)  
401 E. Third St.  
Kewanee IL 61443  
United States

Item	Alt. Item #	Units	Description	QTY	Unit Sales Pri...	Amount
200129-01			Snap-Change Cylinder, Carbon-Wrapped, Pressure 4500, 45 Minutes (at 40 lpm)	36	1,319.12	47,488.32
FP1MK0000000000			Vision C5 Facepiece (NIOSH/NFPA Approved) Medium Face Seal, Kevlar Headnet, No Spare Headnet	24	346.92	8,326.08
X8914026305304			AirPak X3 Pro SCBA (2018 Edition) with Snap-Change Cylinder Connection, 4.5, Standard Harness w/ Parachute Buckles, Standard Belt with No Escape Rope, EZ Flo C Regulator with Quick Connect Hose (Rectus fittings) Universal EBSS Accessory Hose, No Airline Connection, No Spare Harness Kit, Pak-Tracker, No Case, Packaged 2 SCBA per Box (black)	18	7,612.06	137,017.08
804723-01			(HM) CYL&VLV CARBON 60	2	1,469.18	2,938.36
200954-32			RIT-PAK III,4.5,LG,C5,RECTUS	2	3,747.77	7,495.54

<b>Subtotal</b>	203,265.38
<b>Shipping Cost (FedEx Ground)</b>	0.00
<b>Total</b>	\$203,265.38

This Quotation is subject to any applicable sales tax and shipping & handling charges that may apply. Tax and shipping charges are considered estimated and will be recalculated at the time of shipment to ensure they take into account the most current local tax information.

All returns must be processed within 30 days of receipt and require a return authorization number and are subject to a restocking fee.

Custom orders are not returnable. Effective tax rate will be applicable at the time of invoice.



QT1527621

# Community Leasing Partners:

## Division of Community First National Bank

### A Proven Leader

**Community Leasing Partners** is a division of Community First National Bank in Manhattan, Kansas, specializing in tax-exempt, municipal lease purchase financing. Our company retains key personnel, with more than **100 years** of combined industry specific experience, in addition to a full staff of 100+ banking professionals. This expertise allows us to respond quickly to inquiries and offer innovative solutions for a wide range of leasing situations. Our focus is on municipal finance, and throughout the years, we have evolved into what we are today – **a leader in the municipal finance industry**.

We have been fortunate to work with political subdivisions of all sizes, with budgets as small as \$25,000 to billions of dollars. Throughout the past 25+ years, our team has financed **two billion dollar's** worth of equipment for municipal and non profit entities.

We finance projects in almost every state in the country, working with a variety of manufacturer and distributor contacts. We have specialized finance programs that have been developed through years of experience and by **listening to our customers**.

As a division of a bank, we are a direct funding source for transactions and offer **extremely competitive interest rates**, friendly service, quick responses on quote requests, and expedited credit approvals and issuances of contracts.

We are confident you will find our combination of rates, service, and programs to be **unmatched by any other finance company** in the country.



*Your municipal financing experts.*

Division of Community First National Bank  
www.clpusa.net info@clpusa.net 888.777.7850

# Top 10

## Reasons to Finance

- 1. Safety** – Through new equipment or vehicle purchases, employees have access to the latest and safest technology available.
- 2. Warranty Coverage** – With new equipment comes a product warranty which will ensure you can have the peace of mind knowing you have the best equipment available, without additional costs to fix.
- 3. Simplifies Inventory Management & Maintenance** – By purchasing what you need at one time, all the equipment or vehicles can be tested and maintained at the same interval, thereby, reducing the challenges and additional costs related to dissimilar vehicles and equipment.
- 4. Morale & Retention** – By purchasing all that is needed at one time, all employees will have access to the newest and safest technologies – keeping morale and retention at a high level.
- 5. Predictable Budgets & Replacement Schedule** – With a finance plan in place, you retain fixed and predictable payments for your equipment and vehicle budgets. Replacement of vehicles and equipment would also be predictable as they would have an easily identifiable start and end date.
- 6. Compatibility** – With all new equipment, you won't have to worry about compatibility or alternate product training, ensuring a safer work environment.
- 7. Improved ISO Rating** – Fire departments purchasing new vehicles, stations or equipment, have an opportunity to improve their ISO rating, thus decreasing the overall insurance costs for their community.
- 8. Save Money** – By purchasing the equipment or vehicles you need today, you can reap the benefits of a lower per-unit-price by eliminating future price increases. You will eliminate the costs of maintaining outdated vehicles and equipment as well.
- 9. Quick & Easy** – Financing your equipment or vehicle is quick and easy when working with the experts at CLP. Give us a call today!
- 10. Training & Industry Standards** – With ever changing standards and training requirements, you can bring your department's equipment or vehicles up to current standards with one purchase versus several purchases over several years.





# Finance Purchase Program

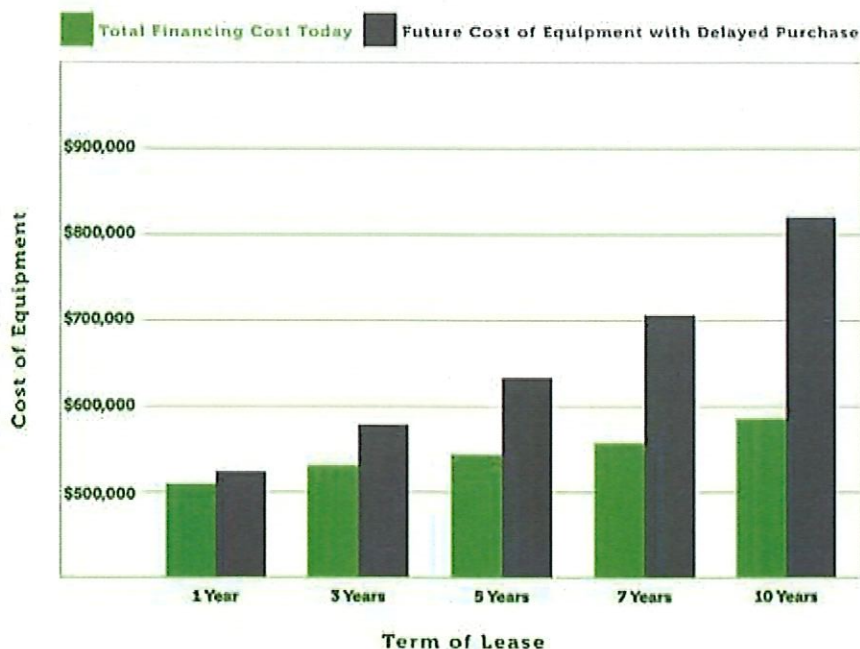
## A Simple, Cost-Effective Alternative

Many cities, counties, districts, and volunteer departments are faced with pressure that occurs **when demands for their services outpace their financial resources**. To keep up with regular or even unplanned apparatus replacement, municipal entities must become more creative in finding alternatives to simply using their capital reserves to purchase their essential apparatus and equipment. To cope with this problem, many are utilizing an **alternative, long-recognized as a source of funding for capital expenditures** – lease purchase financing.

Using a typical lease purchase agreement, the political subdivision and the financing company enter into a repayment plan for a fixed number of years. With a **repayment structure designed to meet the unique needs of the organization**, payments can be made annually, semi-annually, quarterly, or monthly at any point in time throughout the budget year.

Considering long-term costs, **a lease purchase plan can result in a cost savings!** In some situations, organizations feel they can only afford to purchase new equipment if they have a substantial down payment or can pay cash for the purchase. However, by delaying a purchase, the organization is subject to normal manufacturer price increases and inflation, as well as the cost of maintaining the existing equipment.

## Cost of Delayed Purchase



The graph illustrates the **cost effectiveness** of financing your purchase today, versus waiting even one year to buy your equipment or apparatus.

Entering into a finance purchase plan today with fixed, manageable payments can provide a **cheaper overall cost** for acquiring equipment or apparatus.

### Take advantage of:

- » Flexible terms
- » Low, Competitive Interest Rates
- » Simplified Credit Process
- » \$0 Documentation or Closing Costs
- » Early payoffs available
- » Bank Direct Funding
- » Defer Payments to Next Budget Year

\*Base equipment price used for example is \$500,000. An average price increase of 5% per year has been used for "Future Equipment Cost" calculations. The prices and lease payments shown above are for estimation purposes only. Please contact your local representative for exact figures. MAINTENANCE COSTS OF KEEPING OLDER EQUIPMENT IN SERVICE ARE NOT INCLUDED.



**Your municipal financing experts.**

Division of Community First National Bank  
www.clpusa.net info@clpusa.net 888.777.7850



Phone: 888.777.7850  
Fax: 888.777.7875  
Cell: 785.313.3154  
215 S. Seth Child Road  
Manhattan, KS 66502  
[www.clpusa.net](http://www.clpusa.net)

May 11, 2022

Customer Name: Kewanee, IL  
Steven Welgat, Chief

Equipment: Scott SCBAs  
Sales Representative: Frankie Vulcani @ MES  
Delivery: TBD

Community Leasing Partners, a Division of *Community First National Bank*, is pleased to present the following financing options for your review and consideration.

**Option 1**

Total Cost:	\$	203,000.00	Payment Frequency:	Annual
Down Payment:	\$	100,000.00	First Payment:	One year from closing
Trade In:	\$	-		
Amount Financed:	\$	<u>103,000.00</u>		
Term in Years:		<u>1</u>	<u>3</u>	<u>5</u>
Payment:		\$107,525.82	\$37,111.67	\$23,132.69
Factor:		1.043940	0.360308	0.224589
Interest Rate:		4.39%	3.99%	3.99%

**Option 2**

Total Cost:	\$	203,000.00	Payment Frequency:	Annual
Down Payment:	\$	50,000.00	First Payment:	One year from closing
Trade In:	\$	-		
Amount Financed:	\$	<u>153,000.00</u>		
Term in Years:		<u>1</u>	<u>3</u>	<u>5</u>
Payment:		\$159,722.82	\$55,127.05	\$34,362.16
Factor:		1.043940	0.360308	0.224589
Interest Rate:		4.39%	3.99%	3.99%

- **THERE ARE NO DOCUMENTATION OR CLOSING FEES ASSOCIATED WITH THIS PROPOSAL.**
- Fixed interest rate for the terms provided unless otherwise stated.
- The quoted interest rate is valid for 14-days from the date of the proposal. To lock in the interest rate, a credit submission would be required, and a credit approval attained within the same 14-day period. This financing is to be executed and funded within 30 days of the date of the proposal, or Lessor reserves the right to adjust the interest rate. The proposal is subject to credit review and approval of mutually acceptable documentation.
- This proposal has been prepared assuming the lessee is bank qualified and that the proposed lease qualifies for Federal Income Tax Exempt Status for the Lessor under Section 103 of the IRS Code.

**Thank you** for allowing Community Leasing Partners the opportunity to provide this proposal. If you have any questions regarding the options presented, need additional options, or would like to proceed with a financing, please contact me at 1-888-777-7850.

Respectively,

Blake J. Kaus  
Vice President & Director of Leasing  
[blakekaus@clpusa.net](mailto:blakekaus@clpusa.net)



*Your Locally Owned Independent Bank*  
[www.commstatebank.com](http://www.commstatebank.com)  
Phone Banking: 877.932.9933

**GALVA OFFICE**

625 SE 2<sup>nd</sup> St., Galva, IL 61434 Phone: 309.932.8181 Fax: 309.932.2289

**KEWANEE OFFICE**

409 Tenney St., Kewanee, IL 61443 Phone: 309.853.8182 Fax: 309.856.8182  
300 N. Main, Kewanee, IL 61443 Phone: 309.853.8181 Fax: 309.853.3656

**NEPONSET OFFICE**

120 W Commercial St., Neponset, IL 61345 Phone: 309.594.2424 Fax: 309.594.2560

**FRANKLIN OFFICE**

101 West St., Franklin, IL 62638 Phone: 217.675.2311 Fax: 217.675.2621

**Preliminary Term Sheet  
Community State Bank**

Date: May 12, 2022

Applicant(s): City of Kewanee / Fire Department

Dear :

Based on the information you provided to us, we are willing to extend an offer to you for the purchase of an AirPak X3 Pro SCBA with accessories:

Loan Amount:	\$103,000.
Loan Term:	5-year loan.
Payments:	Monthly, quarterly or annual principal and interest payments.
Interest Rate:	3.25% fixed
Doc Prep Fee:	\$250
Collateral:	Purchase money security interest in the equipment to be purchased.
Conditions:	City of Kewanee resolution approving the amount to be borrowed.

This commitment is subject to the receipt of all necessary financial information and other documentation in compliance with the Bank's loan underwriting guidelines and all required closing conditions.

This commitment will expire 120 days from the date of this letter.

We appreciate the opportunity to work with you on this project. Please call me if you have any further questions or financing needs.

Sincerely,

A handwritten signature in blue ink that reads "Ben Nelson". The signature is fluid and cursive, with the first name "Ben" and last name "Nelson" clearly distinguishable.

Ben Nelson  
Vice President





ESTABLISHED 1928

# PEOPLES NATIONAL BANK OF KEWANEE

207 N. TREMONT STREET, P.O. BOX 387  
KEWANEE, ILLINOIS 61443  
PHONE 309-853-3333 FAX 309-853-1708

May 12, 2022

Stephen Welgat  
Fire Chief  
Kewanee Fire Department

Chief Welgat,

Thank you for the opportunity to be of service to the Kewanee Fire Department with the purchase AirPaks' and related equipment. Peoples National Bank of Kewanee would be willing to finance up to 75% of the purchase price of the equipment as follows:

3 year term - your choice monthly or annual payment at 1.84%.

\$103,000.00- 36 months @ 1.84% = monthly payment \$2,946.04

\$103,000.00- 3 annual payments @ 1.84% = annual payment \$35,640.21

\$103,000.00- 60 months @ 1.99% = monthly payment \$1,806.81

\$103,000.00- 5 annual payments @ 1.99% = annual payment \$21,868.11

The loan will pre-payable in whole at any time or in part on any scheduled payment date without any pre-payment penalty. Payments above are estimates and may differ once actual loan amount is determined.

Sincerely,

Craig Lindstrom  
AVP

## Everything You Need!

Phone 309-761-1013  
Fax 309-856-6001

Community Development 2<sup>nd</sup> Part-time Neighborhood Services Coordinator (NSC)

Wage: \$13/hr, \$16,000.00/yr at 25 hours/week.

Additional CitizenServe account: \$2400.00/yr (Price increase coming for FY 23-24 \$3200)

Additional phone extension/line: \$120.00/yr

Total: \$18520.00

The plan would be to divide the City by Tenney and Main Streets. One NSC assigned to the East half and the other to the West half. These assignments would swap every two months in order to keep a fresh perspective on the areas.

Results in an increase of proactive cases and faster response time with resident complaints. More timely follow-up inspections on nuisance and weed complaints.

Potentially could utilize for permit inspections that don't require "special knowledge", for example, fence, driveway and demolition inspections.

Free up my time to follow-up on building permits and inspections on a more timely basis and to follow up on permits where inspections are not being requested. Work on ordinance updates. More time to be proactive on looking for issues happening without permits etc.



Date: May 12, 2022

To: Mayor Moore  
City Councilmembers  
City Manager Gary Bradley

RE: Cemetery Facilities

From: Public Works Operations Manager Kevin Newton

Following the May 9<sup>th</sup> budget workshop and as requested I researched what building a new cemetery facility would entail and approximately cost. I determined a 60' x 125' building would provide the same 7500 square feet of the four buildings we use now combined into one. Moving operations into one building not only makes sense operationally but refurbishing multiple older buildings bringing them up to standard is cost comparable to engineered post frame construction typically used in commercial buildings. I discussed our building needs with a few contractors who build post frame buildings and found there are good, better, and best options, ranging from \$350,000.00 to \$425,000.00. While the buildings are dimensionally the same, with the same floor plan, the difference in cost is largely due to the engineered systems of each manufacturer, and the choices in materials and construction. For example, are the posts or columns buried in the ground or secured onto concrete pre casts? Are the posts and framing solid lumber, or use engineered construction with higher quality lumber that are built to resist twisting and have higher load ratings? I've provided some engineering and construction information along with a and a preliminary general proposal from a few contractors for your review.

We all can agree that the cost of building a new facility for the Cemetery is not going to go down. And if you are familiar with the condition of the buildings we use and how they represent our organization, this issue needs to be addressed sooner rather than later. My recommendation is to proceed with the bidding process to narrow down a more accurate cost. The bidding process will provide competitive pricing and give us the opportunity to determine if there are areas to save money, such as installing our own utilities and or use local vendors. Should the Council elect to fund building a new cemetery facility we want to ensure we build a building that will last 75 to 100 years and represent the best value for the taxpayer. I look forward to discussing this further at our next budget workshop.

<b>Date:</b>	<b>May 6, 2022</b>
<b>Prepared For:</b>	<b>Kewanee Public Works</b>
<b>Contact Name:</b>	<b>Kevin Newton</b>
<b>Phone:</b>	<b>309-761-4857</b>
	<b>Kewanee, IL</b>

Note: Pricing is subject to market conditions at the time of construction.

**Building Type: Lined and Insulated Shop**

**Proposal Type: General Bid. Approximate prices based on preliminary planning.**

**Base Building Description:**

- \* 60' Wide x 125' Long x 16'-0" High (height measures from finished floor to bottom of truss)
- \* Designed to be code-compliant, stamped engineered plans fee included separately below
- \* 4-Ply 2x6 glu-lam columns on sidewalls 8' spacing. 3-Ply 2x6 glu-lam columns on ends 10' max spacing
  - \* Please see PostSaver advanced treatment application upgrade option below
- \* Gable roof with a 3.5/12 roof pitch and flat bottom-chord
- \* Trusses 8' on-center with appropriate ground snow-load, 4# top-chord dead-load, and 5# ceiling-load
- \* Trusses are bolted to columns with two bolts per side
- \* Dri-crete posthole footings. 1.5' diameter sidewalls, 1.5' diameter endwalls
- \* 1" road stone for backfilling column holes
- \* 1 - Row MCA Treated Tongue-and-groove splash .23 PCF treatment retention, 332 linear feet total
- \* 1' Sidewall overhang with ventilated soffit on both sidewalls
- \* 1' Endwall overhang with solid soffit on both gable ends with recessed corners
- \* Vented ridge on both sides of roof for the entire length
- \* Wainscot, both sidewalls Metal, both endwalls Metal - 36" tall
- \* 2 Draftstops - Estimated cost, subject to code requirements
- \* 2 - 14'x14' Overhead Door openings on Sidewall, interior trims
- \* 1 - 10'x8' Door Size Available opening on Wood - Different size board(s), interior trims
  - \* Door figured separately below
- \* 1 - 3'0" x 6'8" Plyco 20 Series walk door with solid panel, polar white
- \* 1 - 3'0" x 6'8" Plyco 20 Series walk door with solid panel, polar white
- \* 1 - Double 6'0" x 6'8" Plyco 20 Series Walk Door with 22"x36" insulated thermal pane 1-lite, polar white
  - \* Door Accessories: 3 - locksets, 3 - deadbolts, 3 - foam-injected jambs
- \* 12 - 4x3 Double Pane/Thermal Windows, horizontal slider
- \* 1 - Partition wall, located 40' from endwall 1, with liner steel on both sides, extending to ceiling
- \* Insulated exterior walls using 6" R-19 Fiberglass Blanket insulation - with white vinyl backing
- \* Interior Wall Liner: 29 J-Panel Interior Liner Panel, with vapor barrier
- \* Ceiling Liner: 29 J-Panel Interior Liner Panel with 6-mil plastic vapor barrier
- \* Insulation bumpers at eaves included
- \* Exterior Wall Metal: 29 Gauge J-Panel Profile Siliconized Polyester Paint G90 Substrate
- \* Roof Metal: 29 Gauge J-Panel Profile Siliconized Polyester Paint G90 Substrate
- \* Weather resistive air & moisture barrier (house wrap) on 4 walls

- \* Bird blocking between roof purlins - gables only
- \* Standard hex-head screws with matching color heads to attach metal panels and trims
- \* 1 - 10'x60'x10'-0" Mono-sloping porch with the following specifications:
  - \* 10'-0" from finished floor to ceiling. 3.5/12 roof pitch, mono trusses
  - \* Concrete under porch figured separately below

**Total Base Building, Materials and Labor:**

**\$227,284.23**

**Additional Items:**

Structural stamped engineered plans	\$1,650.00
Cellulose blow-in attic insulation, R-value 38, blown 12 inches thick	\$9,075.00
Overhead doors	\$20,790.00
<ul style="list-style-type: none"> <li>* 2 - 14' x 14' CHI Model 3216 overhead doors               <ul style="list-style-type: none"> <li>* Commercial 26-gauge R-17.54 1-7/8" Urethane injected, thermally-</li> <li>* Commercial Medium Duty - Model MT 5011 U - 1/2 HP or equivalent</li> <li>* Color: White</li> <li>* 4 - 3 Button Deluxe Transmitter (remote controls)</li> </ul> </li> <li>* 1 - 10' x 8' CHI Model 3216 overhead doors, High-Lift               <ul style="list-style-type: none"> <li>* Commercial 26-gauge R-17.54 1-7/8" Urethane injected, thermally-</li> <li>* Commercial Medium Duty Jackshaft - Model MJ 5011 U - 1/2 HP or</li> <li>* Color: White</li> <li>* 2 - 3 Button Deluxe Transmitter (remote controls)</li> </ul> </li> </ul>	
6k seamless gutter, downspouts on both sides, Tiled	\$4,070.00
5k seamless gutter, downspouts, Tiled, on Porch	\$695.20
5" Concrete floor, reinforced w/ wiremesh, vapor barrier, no sealer	\$43,450.00
7500 Total floor square footage, 4000 PSI Compressive Strength	
8" wide x 16" deep thickened edge/rodent barrier:	\$2,791.80
Concrete under porch #: 1, Total square feet of concrete: 600	\$2,805.00
Dumpster	\$3,953.12
Portable Restroom	\$560.62
Builder's Risk Supplemental Insurance	\$1,625.02

**Grand Total Project:**

**\$318,750.00**

**Upgrades Options:**

<ul style="list-style-type: none"> <li>* 26 guage steel, Kynar painted wall, roof, trim - G-90 galvanized edge-rust (Substantially reduces chalking, fading, and edge-rusting)</li> <li>* PostSaver advanced treatment application:</li> <li>* True-Board Steel Grade Board upgrade vs. wood grade boards:</li> <li>* 8" wide x 48" deep insulated frost wall, 370 Linear feet</li> <li>* Optional geotechnical soil test estimate (official quote required):</li> </ul>	\$12,150.00 \$4,300.00 \$1,300.00 \$21,700.00 \$3,500.00
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### **General Stipulations:**

- \* All quotes are subject to code & permit approval. All permit fees are to be obtained and paid by customer.
- \* This quote assumes that electricity is readily available within reasonable distance of jobsite.
  - \* A 1/2 % surcharge added to project total will be applied to jobs without readily available electricity.
- \* If stamped engineered plans are required, additions for design requirements may be required.
- \* **During times of extreme market volatility, prices will be honored through end of day Friday.**
- \* Jobsite to be fully prepared by others with adequate space and level working aprons.
- \* Jobsite to be reasonably accessible (firm access lane with minimal slopes, adequate width, so forth)
- \* Quote includes current prevailing wage for the applicable county
- \* A geotechnical engineering (soils) test is recommended for all new buildings to determine the soil and geologic conditions of a property and to provide recommendations and design criteria for construction.
- \* This quote assumes exposed electrical conduit. Requests for in-wall wiring will incur additional costs.



 **FBI Buildings**

# STRUCTURAL INTEGRITY

*in Post-Frame Construction*

 FBI

 FBI

Maximize the Value of Your Building Investment



# Understanding Structural Integrity



**T**his book will give you a basic understanding of how post-frame building systems work. It will help you make a better-informed buying decision—and as a result enjoy:

- **Greater confidence and peace of mind** with regard to building performance, permanence, and safety.
- **Lower cost in the long run.** Making a well-informed investment in a high quality, well-engineered building system now can save money later.
- **Greater resale value.** A more structurally sound building can have greater appeal to a prospective buyer.

---

## Why Post-frame Construction is Stronger Than Conventional Wood Construction

- *Posts [columns] in the ground add to the building's stability and wind resistance.*
- *Horizontally connected columns form a tremendously strong box that adds to wind and seismic resistance.*
- *The direct attachment of trusses to the post frame makes it virtually impossible for the roof to detach from the building.*
- *The diaphragm effect created by post-frame structures allows them to flex under stress instead of cracking, crumbling or collapsing like many other structures.*

---

—“The Post-frame Advantage: It’s Long-lasting and Resilient,”  
Frame Building News, January 2003

## Why a Professionally Engineered System is a Better Value

Each component of a building system is important. From the engineering and fabrication of your trusses to framing components and columns to the proper specification of the foundation, steel, fasteners, and paint, your new building will only be as strong as its weakest component. And while there may be many who say they can assemble a building, very few have the engineering resources and manufacturing capabilities to ensure that every component of your new building system is engineered correctly to optimize building performance and longevity.

## Why You Can’t Rely on Building Codes

Building codes set the minimum standards. Some counties only require that a portion of the building, such as trusses, have an engineering stamp to be permitted, others don’t require building permits for agricultural structures.

It’s up to you to decide the right balance between strength and cost. Don’t just leave it up to the builder to set your performance standards.



## Why Selecting the Right Builder is Important

Many builders emphasize low initial cost over building longevity and strength. As with most things in life, when it comes to buildings we get what we pay for.

Also keep in mind that very few builders actually have control over the entire construction process, especially critical aspects such as:

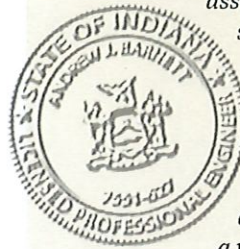
- Engineering resources
- Truss manufacturing facilities
- Knowledge or the skilled field labor and equipment required to build for longevity

**KEY POINT:** Specify a building that is engineered to your standards of structural integrity. Sometimes this may exceed the minimum standards set by the builder or building officials.

### IF YOU'RE LOOKING FOR THE ULTIMATE IN PEACE OF MIND, READ THIS...

Ask if your builder is willing to provide a licensed engineer's stamp\* on all drawings that identify the key building components. The stamp signifies that the engineer has the competency and capabilities to certify that the entire structure will meet design requirements from top to bottom.

Just knowing that the builder is willing to provide such a stamp on multiple drawings may be enough assurance for you. If you want to go a step further, actually request the stamp on all drawings that identify key building components. You may have to pay an additional fee for this service. However, for the building owner who wants additional security, this fee may be a worthwhile investment.



\* A professional engineer's stamp is generally acquired by an engineer after attaining an engineering degree, practicing in an engineering-related field for four years, and passing a rigorous test. A structural engineer's stamp requires passing an even more stringent test.

## How To Choose The Best Builder For Your Project

- ☐ Examine the builder's written warranty to ensure that the warranty is a **non-prorated warranty** and that the builder handles all warranty work.
- ☐ Make sure the builder is willing to provide a licensed engineer's stamp on all drawings that identify key building components.
- ☐ Ask about the builders approach to risk management; does the builder have a written process for chaining and bracing during construction, and ask to see documents regarding builder's insurance, workmen's compensation and bonding.
- ☐ Ask for references; "ask around" about the reputation of your builder regarding quality of materials, craftsmanship and service after the sale.
- ☐ Find out how long they've been in business. Look for a long, successful track record and choose a builder that will still be around to service your building investment in the future.
- ☐ Make sure everyone involved in your project (sales, engineering, construction, project management, truss plant, etc.) all work for the same company.
- ☐ Determine how well your builder is prepared to help you through the planning process. See what resources and guidance they are willing or able to provide early in your project.
- ☐ Ask about the builders' safety record and employee turnover as well as the experience and training of the building crew and foremen to make sure committed company employees will construct your building.
- ☐ Finally, make sure your builder is a member of the National Frame Builders Association. NFBA members specialize in post-frame construction and make a professional commitment to sound construction methods and ethical business practices.

**KEY POINT:** A non-prorated warranty is your best assurance that any defect in materials and workmanship are covered. Example: A 20-year non-prorated warranty means the materials and workmanship are covered 100% for 20 years. A 40-year prorated warranty means the materials and workmanship would only be 50% covered in 20 years.

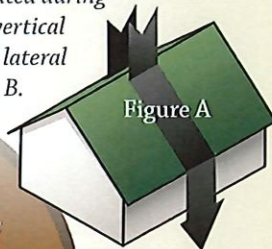


# Load Path the Interconnecting Network

A thorough understanding of the interaction between “loads” and material properties is important.

Any building, regardless of size or location, must be designed to safely resist the structural loads anticipated during its lifetime.<sup>1</sup> These loads can be divided into two categories – vertical loads and lateral loads.

*Figure A - Buildings must be engineered to withstand all the structural loads anticipated during their lifetime, whether vertical loads, as shown here, or lateral loads as shown in figure B.*



## LOAD PATH

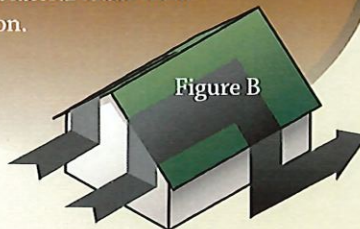
**Definition in post-frame construction:**

**Vertical Loads:** Loads acting in the up-and-down direction. Examples: building contents (second stories, lofts, decks), snow on top of the building, and the dead weight of the building itself.

### Lateral Loads:

Loads that act in a direction parallel to the ground, primarily wind and seismic (earthquake) forces, provide a greater challenge. Because those forces can be felt on the building from any direction, the structure must be designed to withstand lateral loads from any direction.

*Figure B - Wind load is unique in that it can act in any direction; therefore a building must be able to resist loads acting parallel and perpendicular to any wall of the building.*



## How External Forces Can Affect the Load Path

**KEY POINT:** Maintaining a complete and continuous load path from roof & walls to the soil is essential. Each key component in the load path must be strong enough to carry the anticipated design loads.

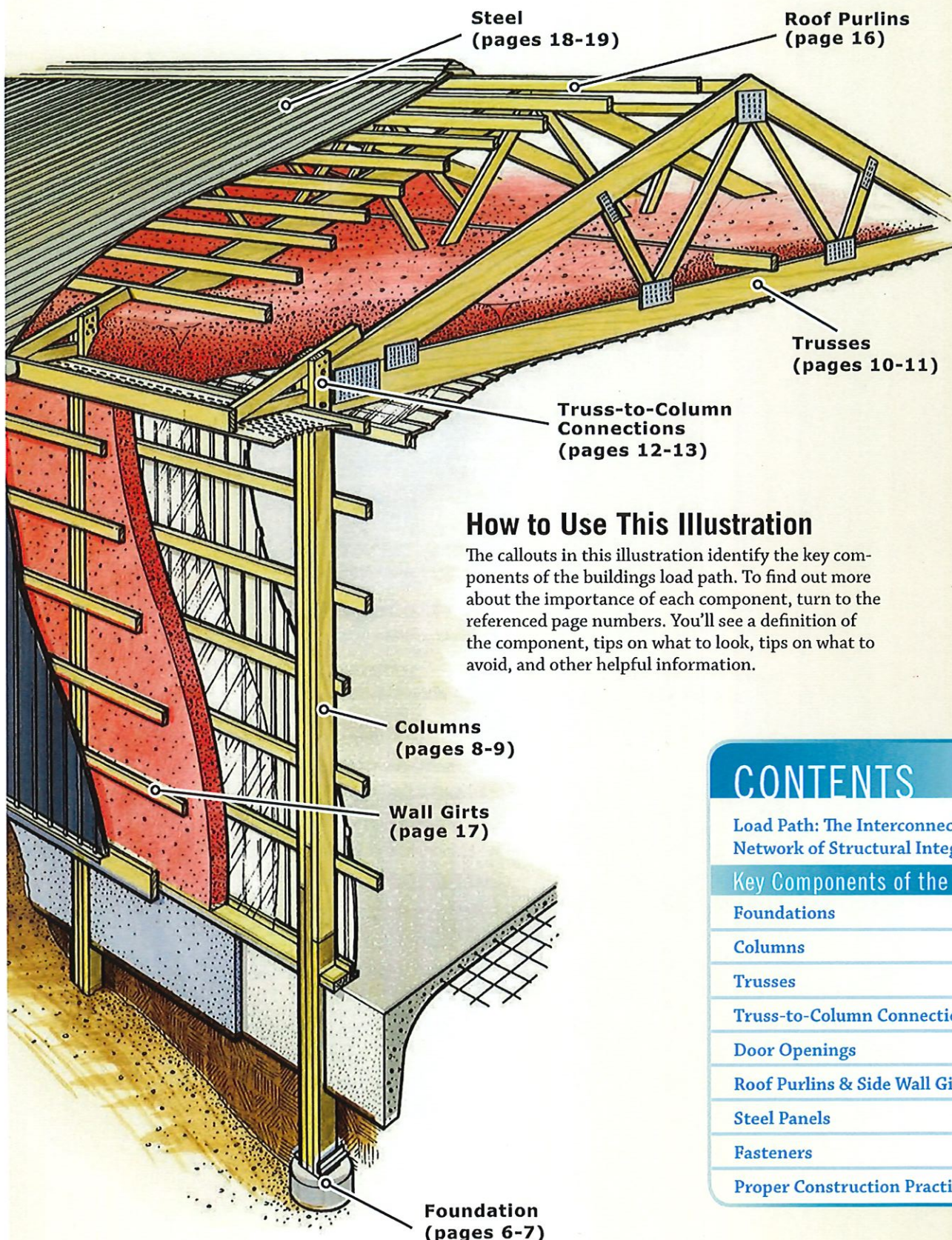
All loads, regardless of whether they are vertical or horizontal, must be able to pass from the areas in which the load is applied to the foundation/soil. This transfer of forces through the structure is called the load path. A continuous load path transfers all vertical and lateral loads from building component to component until the loads have been transferred into the foundation.

<sup>1</sup> Identical buildings placed in different locations may be engineered to different standards. This is because of “exposure factors” at the building site. E.g., buildings in an open field are exposed to more wind vs. buildings sheltered by trees. Be sure your builder takes exposure factors into account when designing your building.

The drawings in this book are for illustrative purposes only. They show optional items such as concrete floor, insulation and interior liners that are not included in all buildings. The specifications of FBi Buildings are subject to change without notice. The details in your building contract and plans supersede anything shown in this brochure.



# of Structural Integrity



## How to Use This Illustration

The callouts in this illustration identify the key components of the building's load path. To find out more about the importance of each component, turn to the referenced page numbers. You'll see a definition of the component, tips on what to look for, tips on what to avoid, and other helpful information.

## CONTENTS

Load Path: The Interconnecting Network of Structural Integrity	4-5
Key Components of the Load Path	
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Door Openings	14-15
Roof Purlins & Side Wall Girts	16-17
Steel Panels	18-19
Fasteners	20-21
Proper Construction Practices	22-23



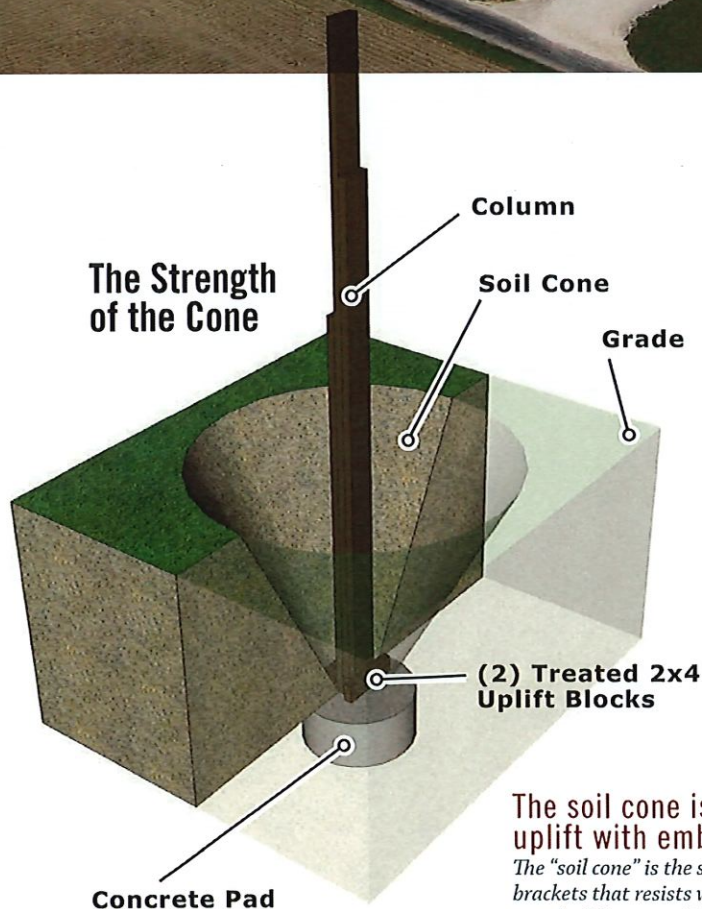
# How the Foundation Affects Structural Integrity

## FOUNDATION

*Definition in post-frame construction:*

The firm, solid basis by which columns are supported; a concrete footing for the column.

**The Strength of the Cone**



A firm foundation consisting of properly installed footings to support the intended structure and its design load is essential to the structural integrity and performance of your building.

Footers must be:

- Adequate size to support the intended structure and its design load
- Extend below exterior grade sufficiently to be free of frost action during winter
- Properly installed over well-compacted soil
- Consistent with the requirements of local building codes

**The soil cone is critical to resist uplift with embedded columns.**

*The "soil cone" is the soil above your uplift brackets that resists wind forces that try to suck your building out of the ground. The larger the soil cone, the more uplift resistance you have.*



## WHAT TO LOOK FOR

### Uplift Anchors

Uplift anchors are rigidly attached near the base of the embedded column to significantly increase the force required to pull the column out of the ground.

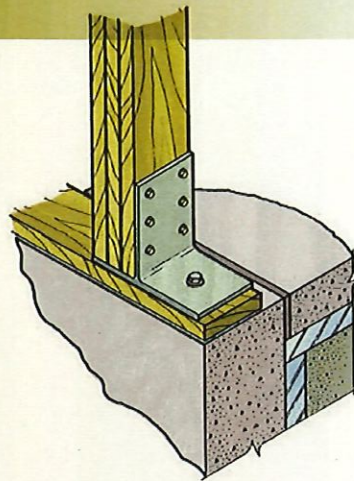
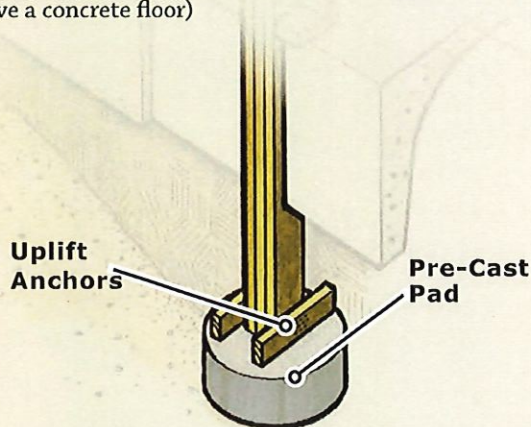
### Poured-in-Place or Pre-Cast Pad

Poured-in-place or pre-cast concrete pads provide solid, non-shifting, loadbearing support so that your building won't sink or get lifted out of the ground. If your building will have a continuous poured or block foundation, columns should be firmly anchored to the foundation with foundation brackets specially designed for this purpose.

### The Option of Gravel Backfill

Be sure your builder offers you the option of crushed rock (gravel) for backfilling column holes. This option provides:

- More lateral and uplift resistance than backfilling with soil
- Less settling around the columns later (important if you have a concrete floor)

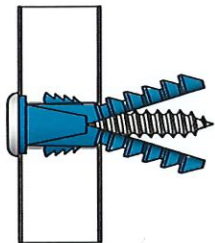


Continuous poured foundation

## WHAT TO AVOID

### Packaged, Powdered Concrete Mix (such as the Sakrete Brand) in Column Holes as the Basis for Their Foundation

Dry, powdered concrete mix can be used to augment uplift or gravity load-carrying capacity. **However, it should never be used as the sole means of load bearing.** Powdered concrete requires ground moisture before it sets. However, too little or too much moisture can be bad and cause weakening. Without an adequate amount of available moisture in the surrounding soil, the concrete will remain loose and unstable and may end up sinking – therefore jeopardizing your building's structural integrity.

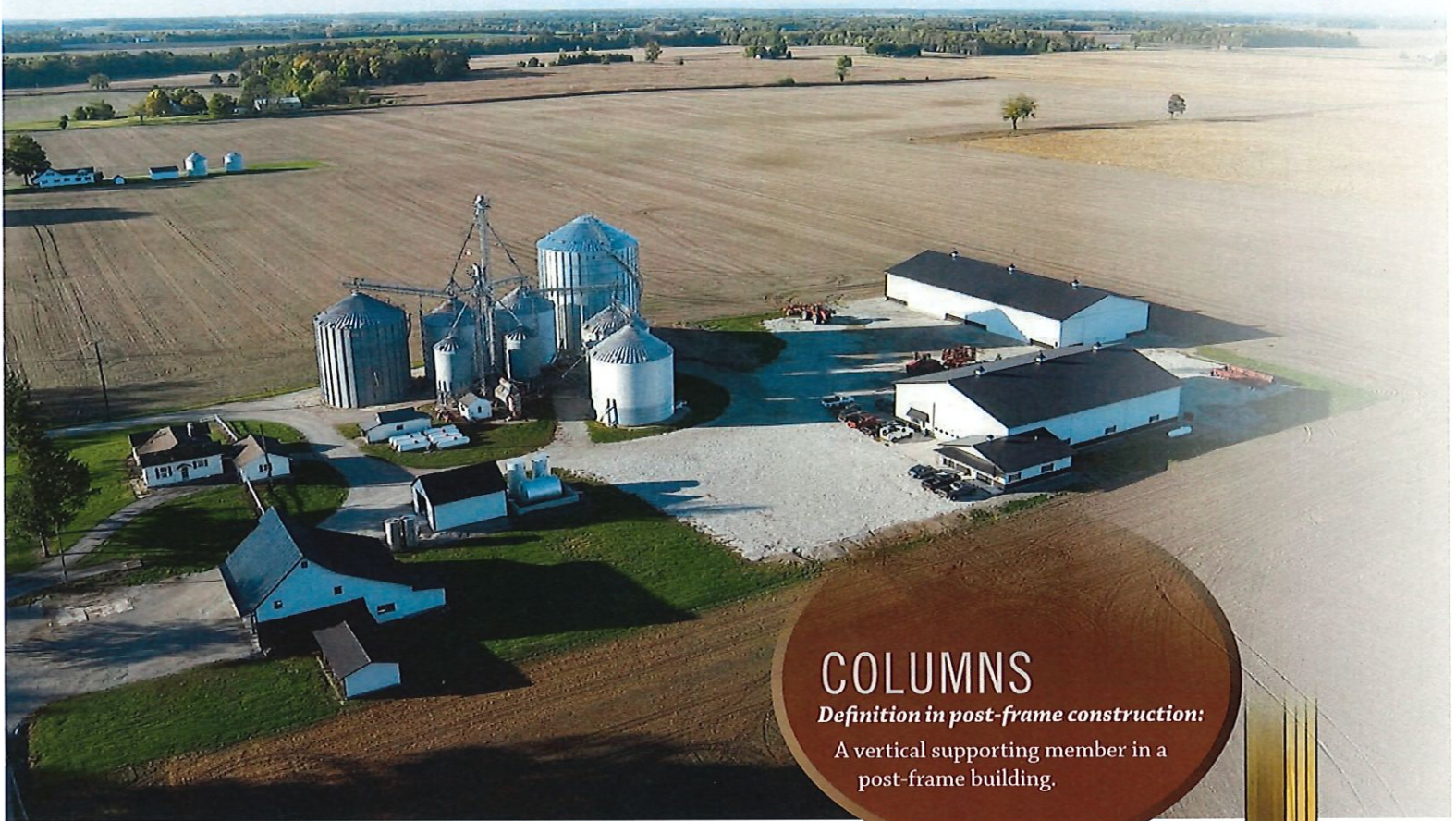


This is an illustration of a common, household drywall screw. See how the drywall anchor – the blue part – adds “wings” to the screw? Those wings keep the screw from working its way out and lifting away from the wall. In post-frame construction, uplift anchors serve a similar purpose: to keep a column from lifting out of the ground.

**Think about this:** Imagine your body is a post-frame building and your legs are the columns. You are standing with a 50# weight on your shoulders. Imagine the strain and difficulty you'd have staying upright if one foot was on solid concrete and the other on soft mud. You can build a building on almost any foundation, if you distribute the load well enough. (12" square piece of plywood underneath your shoe is more effective than your footprint.)



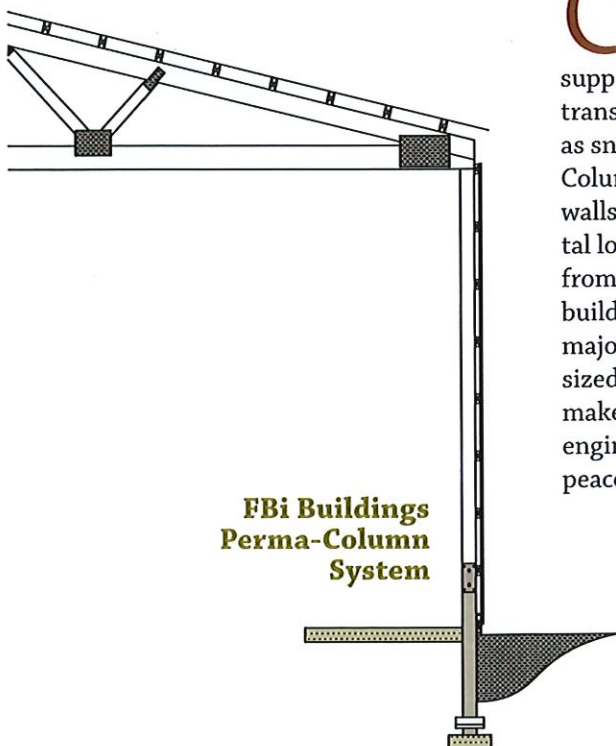
# How Columns Affect Structural Integrity



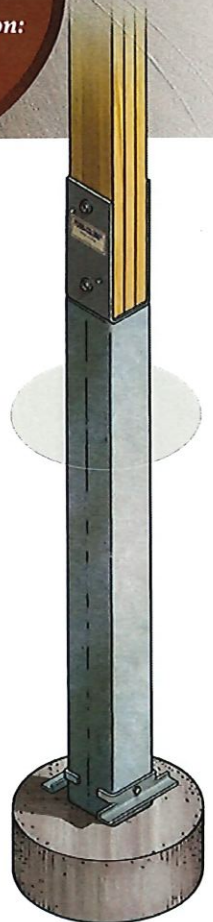
## COLUMNS

*Definition in post-frame construction:*

A vertical supporting member in a post-frame building.



Columns, also referred to as posts, are integral parts of a post-frame building. They support the entire roof system and transfer all vertical loads (such as snow) directly to the footings. Columns are the backbone of your walls and assist in resisting horizontal loads most commonly occurring from winds. Keep in mind that your building's diaphragm carries the majority of the wind loads so "over-sized" columns will not necessarily make your building stronger, it is the engineered system that will ensure peace of mind.





## WHAT TO LOOK FOR

### • Laminated Columns

Laminated columns are typically made from 2 x 6, 2 x 8 or 2 x 10 treated lumber mechanically laminated with nails.

- Strong, stress rated and pressure-treated for long life
- Highly resistant to twisting or warping
- Made from SYP #1 with bending stress ratings of 1350 lbs./sq. in. (for 2 x 6 lumber) 1950 lbs./sq. in. (for 2 x 8 lumber)
- Greater resistance to bending because there is very little chance of a knot being in the same place on all three pieces
- Stronger interlocking truss-to-column connections compared to connections made with solid posts
- Greater longevity because each layer of lumber is completely permeated with wood preservative and kiln dried to lock-in the treatment and prevents rot and termite damage

*Note: Most square posts are number two-graded wood at only 850 lbs./sq. in. And wood preservatives cannot fully permeate the thickness of a solid post.*

*Note: Mechanically laminated columns are referenced in many model-building codes such as the International Building Code which municipalities adopt and amend for local codes. \**

### • Columns Placed at an Appropriate Depth

Column should be set at least 4' below grade.\* This ensures:

- Adequate resistance to lateral and uplift forces (see cone image, page 6)
- Columns will not heave up due to winter freezing of the ground

*\* The exception to this is if the column is anchored to a continuous concrete foundation.*



## WHAT TO AVOID

### • Ordinary Solid (square post) Columns

Square posts are weaker and more susceptible to warping, cracking, and rot.

### • Columns Set Too Shallow of a Depth

This causes a little resistance to lateral forces.

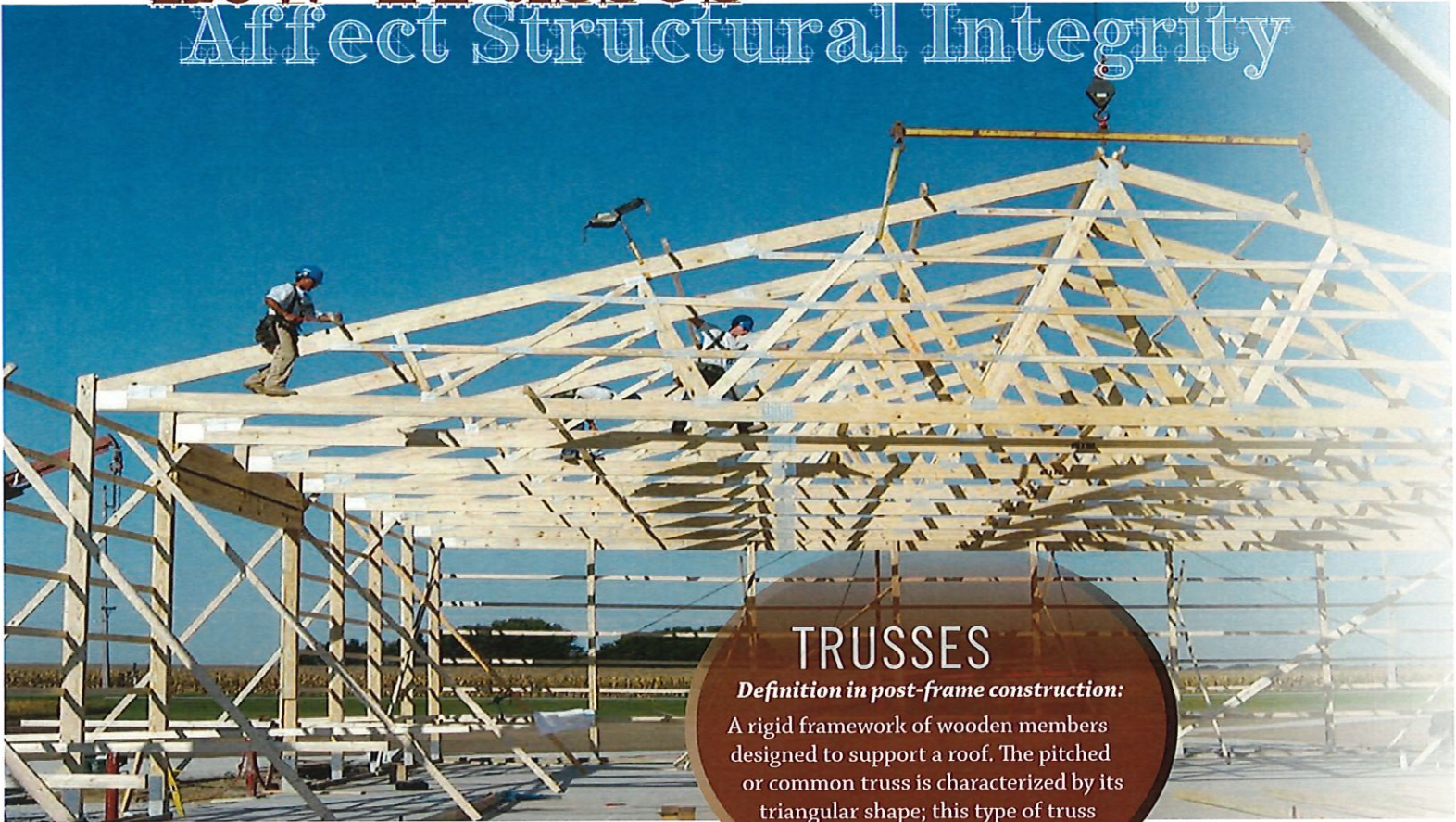


### About Treated Wood in Columns

Use of Chromated copper arsenate (CCA) wood preservative is EPA-approved for post-frame columns. CCA has a long and proven history, unlike newer treatments, such as ACQ. For maximum longevity, look for columns that are saturated with more than .80 lb./cu. ft. of preservative, 33% more than the American Wood Preservers Association's minimum standards of .60, which you'll find in lumberyards.



# How Trusses Affect Structural Integrity

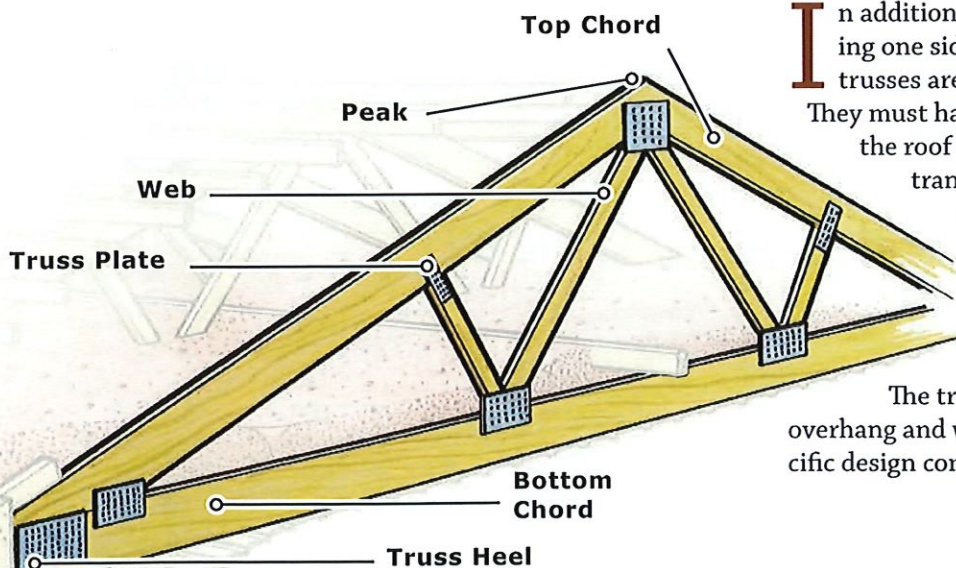


## TRUSSES

### *Definition in post-frame construction:*

A rigid framework of wooden members designed to support a roof. The pitched or common truss is characterized by its triangular shape; this type of truss is most often used for roof construction.

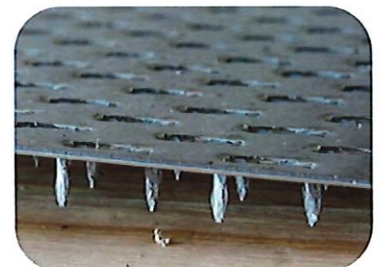
*It is important to remember that a truss is just one part of the overall building system. The entire building must be designed to handle multiple loads, oftentimes occurring simultaneously. You can have the strongest truss system possible and your building may still fail.*



**I**n addition to supporting the roof and connecting one side of the building to the other, trusses are a key component of the load path. They must handle all of the loads applied to the roof via the roof steel and purlins and transfer those loads effectively to the columns. Having properly designed trusses is essential because if one fails, the others will typically follow like dominos resulting in a building collapse.

The truss profile, span, heel height, pitch, overhang and web configuration depend on the specific design conditions and will vary by application.

*Truss Plates are pressed into the side of the lumber using special hydraulic tools. As the plate is pressed in, the teeth are all "driven" simultaneously and the compression between adjacent teeth reduces the tendency to split. Pressing the plates causes the teeth to be pressed straight into the lumber.*





## WHAT TO LOOK FOR

### • Truss Plant Certification by a Third Party

Make sure your builder's truss plant is regularly certified by a third-party inspection service (such as the one provided by the Truss Plate Institute) to ensure quality fabrication of all trusses.

### • Trusses Manufactured to Your Specified Load

Check to make sure your trusses are job ordered and engineered for your building.

Your builder should be able to provide detailed drawings for your job that show material and construction specifications plus load analysis. Ideally, your builder will have a professional in-house engineering staff that uses the latest computer-aided design and simulation systems to ensure strength and structural integrity.

*Also important:* You want to be confident that your trusses are manufactured under stringent quality control standards.

### • Adequate Lumber Quality

There are two ways to grade lumber: visually and mechanically. Visual grading is done manually, with a trained inspector examining boards and assigning a grade based on set criteria. Each board is then stamped with its grade. The grade is important in two ways: aesthetics and design strength. Unless the wood is being used in a "finish" or trim application, the engineers are primarily concerned with strength. They use reference books such as the *National Design Specification for Wood Construction* to determine the design values for each species and grade showing how much the wood fibers can take in terms of bending, compressive, tensile, and shear stresses, among other values. The grade level has a substantial impact on the strength of a board.

**LUMBER FACT** – *Bigger is not always better. Fewer and smaller pieces of high grade lumber can equal or exceed design loads of larger and more pieces of low grade lumber.*



**WHICH IS STRONGER** – *The 2" x 8" on the left or the 2" x 10" on the right? If the 2" x 8" piece is made of higher-grade lumber, it may actually be stronger in values such as bending, compression and tension, than the larger, 2" x 10" piece.*

*The areas that receive more loads should be made of high-grade lumber. When engineering requires it, machine stress rated (MSR) is specified and incorporated into your trusses. Each piece of MSR lumber is tested for stiffness and strength in an electromechanical machine. To further refine the assessment, it is then visually inspected to determine grade. This allows the engineer to cost-effectively design your building with confidence.*

### • Adequate Plate Quality

At critical points in the truss, lumber should be joined with heavy-duty steel plates. Here again, a larger plate is not necessarily better. For instance, a smaller plate with a dense concentration of teeth can be just as strong or stronger than a larger plate with sparsely spaced teeth. Tensile strength, yield strength and gauge also factor into the strength of truss plates.

### • Careful Handling

The way that trusses are delivered to your site is important. The more gently trusses are handled and the fewer times they are moved, the greater their structural integrity.

## WHAT TO AVOID

### Trusses Spaced Too Widely for the Purlins

Trusses are typically spaced 8' on center. Some builders stretch that to 10' on center. This can be a problem if the purlins are not of sufficient grade and size to span the distance.

### Vague Design Criteria

Get specific. Ask what design load the building is engineered to meet. Avoid ambiguous design specifications that only cover one part of the building e.g., steel gauge. And be sure:

- Trusses meet or exceed the minimums for your area
- The design takes into account potential future loads such as drifting from future additions, ceiling materials, solar panels, lights or storage areas

### A "Bigger is Better Mindset"

Bigger isn't always better. A bigger truss constructed of low-grade lumber may be weaker than a smaller one of high-grade lumber. And trusses made with an extra-large bottom chords may look impressive, but they may not be any stronger than trusses with smaller chords. Excellence in truss design and engineering matters.

### Understanding Truss Ratings

ASCE 7 is a nationally recognized standard which defines ground snow loads for geographical areas as well as a host of other criteria such as building exposure, thermal factors, importance categories, and roof slope.



# How the Truss-to-Column Connection Affects Structural

Properly designed, truss-to-column connections strengthen and stabilize the truss. It is vital that this aspect of the load path through which all roof loads are transferred to the ground be properly engineered and not left to the discretion of the builder.

Integrated Connection

Laminated Column

Truss

## WHAT TO LOOK FOR

### • Bearing Lumber

Follow the load path to see how the load is transferred from the roof to the columns to the ground. High quality construction and design optimizes the use of bearing lumber and minimizes points where the load transfer is reliant upon the strength of fasteners.

### • Integrated Truss-to-Column Connections

With an integrated, or "saddled," connection, the truss is interlocked with—not just attached to—the column. Secured from both sides with nails, structural screws or bolts, this truss-to-column design significantly increases the strength of the connection. The results:

- A firm, interlocking wall system
- More efficient load transfer from the roof to the ground to efficiently transfer snow and wind loads
- Increases usable space at the buildings interior—does not require knee bracing (a diagonal brace extending from the column to the bottom of the truss)

## TRUSS-TO-COLUMN CONNECTION

*Definition in post-frame construction:*

The point at which the truss is fastened to a column.

Integrated Truss Column Connection

Purlins on edge for increased strength

Integrated Truss Column Connection

Bearing lumber under truss

Truss Plate

Column



## WHAT TO AVOID

### • Weak Truss-to-Column Connection

With overlapping connections, the truss simply sits on top of or to the side of the column and relies on field-installed fasteners to transfer the loads.

### • 4-foot O.C. Trusses Nailed into the Header

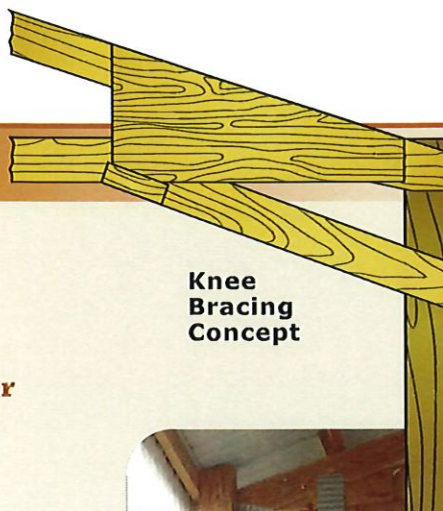
4' on center trusses are not necessarily stronger than 8' on center trusses. Typically, the trusses of a 4' on center system:

- Are designed to carry half the load of the larger 8' on center trusses
- Have many more critical connections
- Result in reduced clearance
- Sit on top of a 1 1/2" header board that is attached to the columns by fasteners not strong enough to carry design loads

In these designs, the columns are still 8' on center. And the additional trusses are simply fastened into a stub that is only connected to the header by a few field-installed fasteners (not direct loadbearing lumber).

### • Knee Bracing

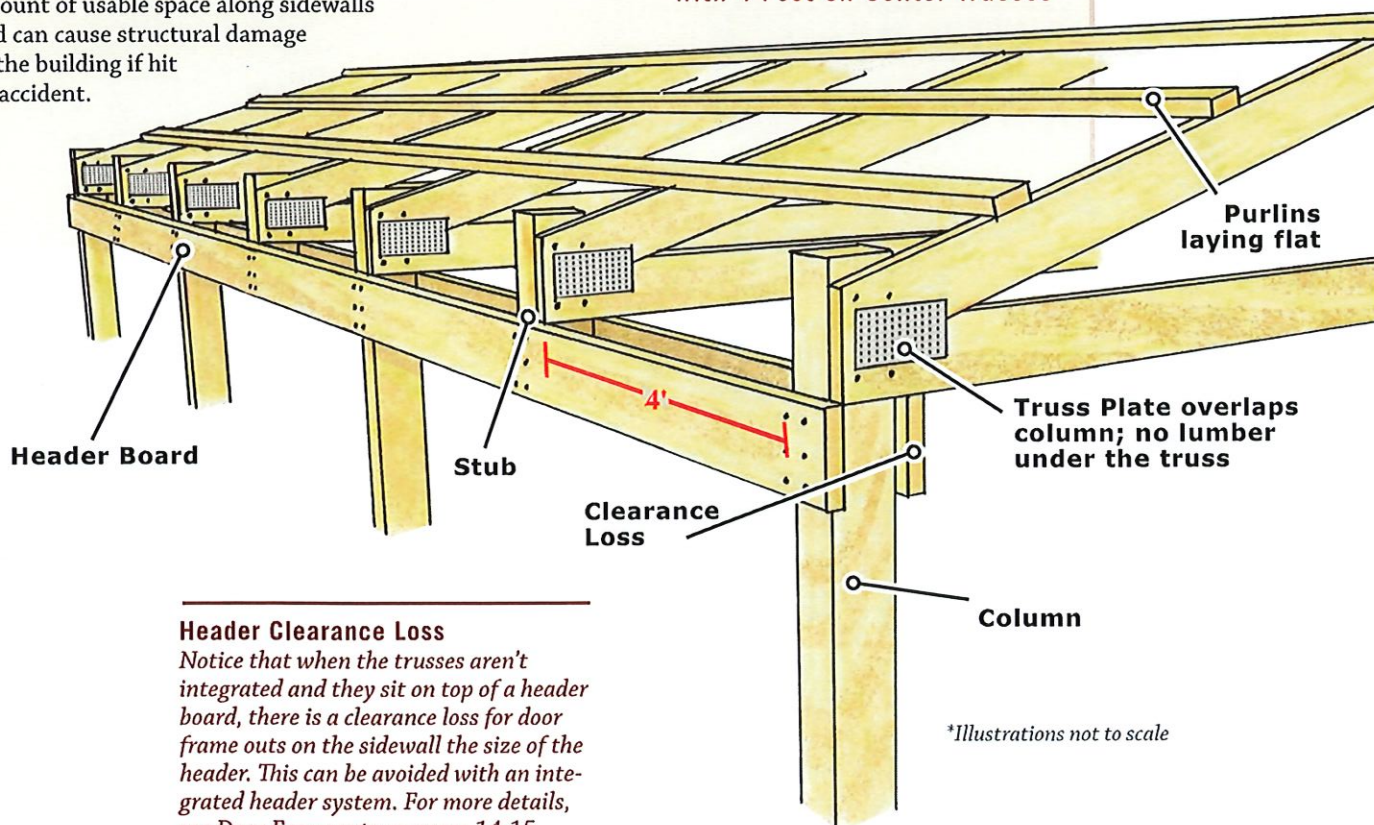
Knee bracing is an outdated way to compensate for a weak truss connection. It also reduces the amount of usable space along sidewalls and can cause structural damage to the building if hit by accident.



Knee Bracing Concept



Weak Truss-to-Column Connection with 4 Foot on Center Trusses



#### Header Clearance Loss

Notice that when the trusses aren't integrated and they sit on top of a header board, there is a clearance loss for door frame outs on the sidewall the size of the header. This can be avoided with an integrated header system. For more details, see Door Frameouts on pages 14-15.

\*Illustrations not to scale



# How Door Openings Affect Structural Integrity

## DOOR FRAMEOUTS

### *Definition in post-frame construction:*

The area of the building in which there is framework in which a sliding, overhead, hydraulic, or other door may be placed to provide an entrance to the building.

In order to accommodate the wind and snow loads around door openings, door frameouts must be engineered to handle higher, concentrated loads. A typical door frameout includes:

- Foundation
- Jamb columns
- Structural header
- Blocking/bracing to connect the door to the building

The door frameout must be rigid enough to keep critical door components aligned for proper door operation in the future. A small deflection in the header could result in the door not operating properly.

There are many criteria to consider:

- Door type, size and location as well as timing installation.
- Whether your building is designed in consideration of the doors being open or closed
- Type of floor
- Footing, header column, truss/header connection

It is critical your builder be familiar with the frameout tolerances and forces in order to ensure a functional system for years to come.

## Door Header and Truss Support

Headers may be steel, engineered lumber, or dimensional lumber. Some header designs may provide more headroom, or have more flexibility of a wider opening.

- Doors on the inside walls of the building are generally supported by end trusses

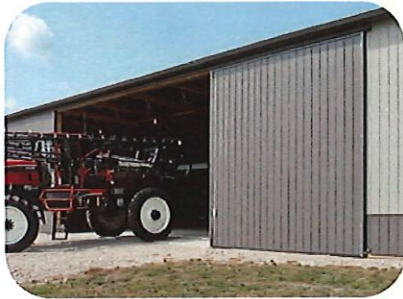
- Doors on the sidewalls of the building and end doors shorter than the height of the end truss are generally supported by headers

**Note:** Regardless of header type, be sure your frameout is engineered to hold the door, the roof system, and the building around it.





## Sliding Door Side Wall Frame Out



## Integrated Truss/Header System



**KEY POINT:** Getting maximum clearance in a side wall sliding door frameout requires an integrated truss system. The trusses in the example are integrated into the steel I-beam. Beware of builders who may just set the trusses on top of the header, resulting in less clearance and weaker connections.

## WHAT TO LOOK FOR

### • Sliding Door Openings

When wind hits a sliding door, it transfers the load through the header, into the columns and down into the foundation. The header or truss must be designed to resist the “buckling” inward force of the wind hitting the door.

### • Overhead Door Openings

When wind hits an overhead door, it transfers a loading into the columns more so than on the header. So while the deflection tolerance of the header is not as critical as on a sliding door opening, the area above the header needs to be designed to resist the wind from pushing it into the building.

### • Hydraulic Door Openings

Hydraulic doors can accommodate wider openings than sliding and overhead doors. When a hydraulic door opens, the top of the door opening is pulled horizontally away from the building at the hinge point. In addition, the connection point at the top of the hydraulic cylinder at the column puts a “twisting” force on the column. To manage these forces, be sure your builder understands the implications and has experience designing your building to accommodate your hydraulic door.

## WHAT TO AVOID

### • Non-Engineered Approach

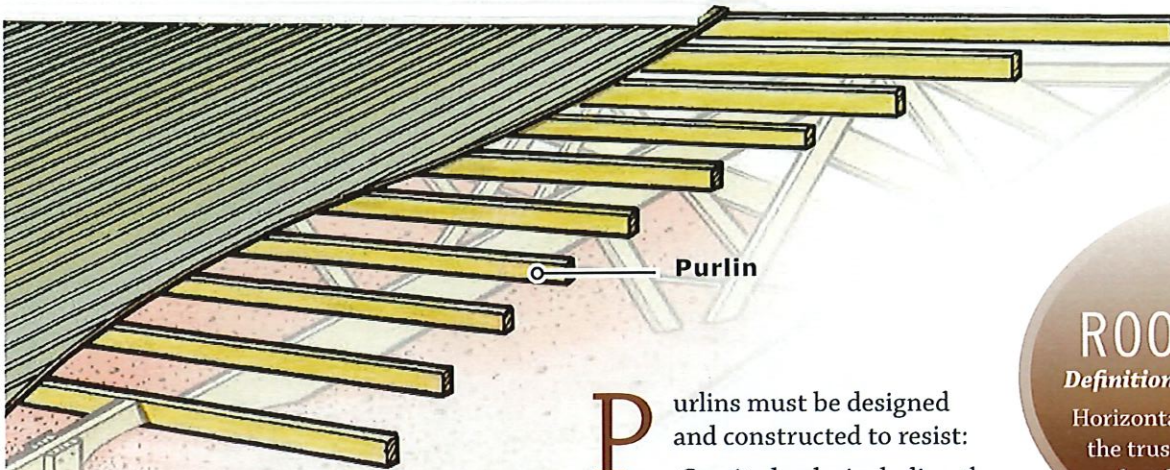
You’ll want to avoid any door frameout approach that is not designed by a professional engineer. This includes systems provided by builders that source and install door and header components vs. an engineered system.

### • Excessive Headroom Loss Due to Non-Integrated Trusses

Make sure you are getting the interior clearance you expect. Look for a systematic design where trusses are integrated into the header maximizing door clearance.



# How Roof Purlins Affect Structural Integrity



## ROOF PURLIN

*Definition in post-frame construction:*

Horizontal members that span between the trusses to provide framing for sheathing material attachment.

- P**urlins must be designed and constructed to resist:
- Gravity loads, including the weight of roofing material and snow
  - Wind uplift loads
  - Loads imposed by laterally bracing rafters or the tops of trusses<sup>2</sup>

## WHAT TO LOOK FOR

### Lumber Grade

Bigger isn't necessarily better. Smaller purlins made from high-grade lumber may carry a heavier load than a larger purlin made of lower-grade lumber. (See page 8 under trusses.)

### Proper Spacing

Check the specifications to make sure the purlin spacing has been designed to meet the snow load requirements. And be sure that the purlins are spaced no farther than 28" on center (typical maximum spacing in the post-frame industry).

For gravity and wind loads, purlin spacing and size depend on how far apart the trusses are spaced. It is important that the maximum spacing be specified with the truss design.

Be sure your builder takes into account the effects of truss bracing, chord forces, purlin strength, and diaphragm strength if using a wider span.

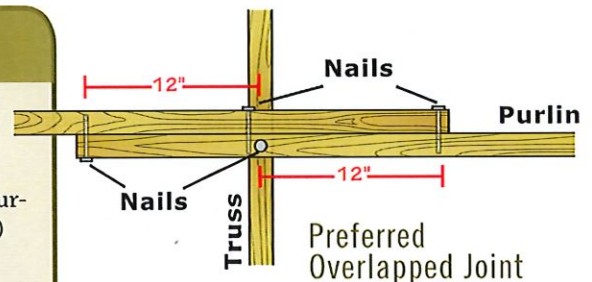
### Overlapping Ends

This requires more lumber, however overlapping purlin ends creates a stronger connection than butting the ends together.

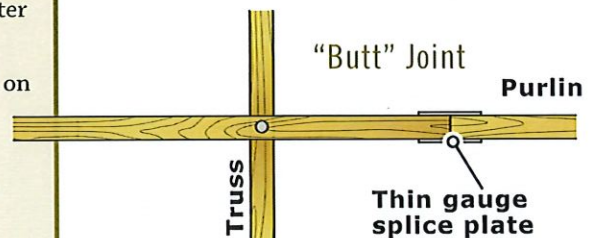
### Predrilled Purlins

Pre-drilling the purlins prior to assembly ensures that the material is not "blown out" by nail guns during the construction process.

<sup>2</sup>Purlins also resist chord forces of the horizontal diaphragm.



Bird's Eye View

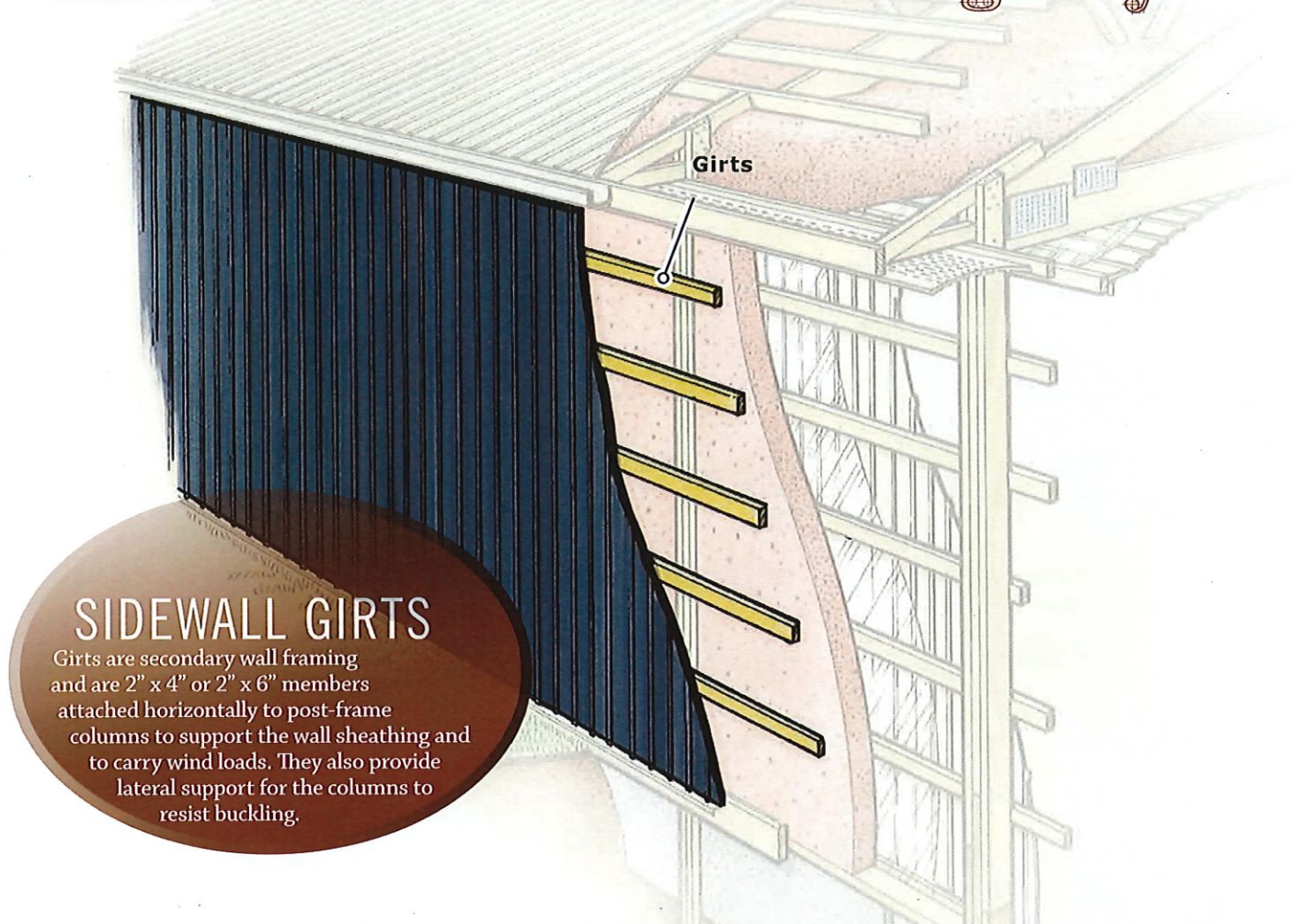


## WHAT TO AVOID

- Unsatisfactory lumber grade
- Purlins spaced greater than 28" on center
- End-to-end "butt" joints
- Drop-in purlins that are "toe-nailed"



# How Sidewall Girts Affect Structural Integrity



## SIDEWALL GIRTS

Girts are secondary wall framing and are 2" x 4" or 2" x 6" members attached horizontally to post-frame columns to support the wall sheathing and to carry wind loads. They also provide lateral support for the columns to resist buckling.

## WHAT TO LOOK FOR

The number of girts and the spacing between them combined with the number and spacing of the siding fasteners make a tremendous difference in the strength and stiffness of your building. (Find out more about the importance of faster quality under "Adequate Quality of Connectors" on page 15.)

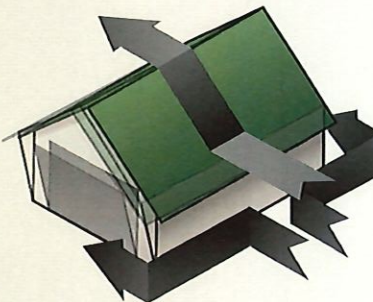
### Understanding "Shear"

The impact of wind on a poorly constructed building can cause it to lean or even collapse. A shear wall is a reinforcement usually achieved with sheets of OSB attached to the framing by a large quantity of fasteners. A shear wall may be needed when the building:

- Has a very large opening on an end wall
- Is extra tall
- Is much longer than it is wide

Your building engineer can determine if one is needed in your situation.

*Walls must be engineered to withstand all the structural loads anticipated, including shear forces that can cause racking of the end walls.*





# How Steel Panels Affect Structural Integrity

## STEEL

### Definition in post-frame construction:

Steel (pre-painted, corrugated steel) is the most common exterior sheathing for roofs on post-frame buildings, although some are sheathed with OSB/plywood and shingled.

## WALL SIDING PANELS

### Definitions in post-frame construction:

Wall siding panels are attached directly to the girts. As with roofing, the most common wall panel material for post-frame buildings is pre-painted corrugated steel.

### Advantages of Steel

- Offers high strength.
- Meets or exceeds all seismic code design standards.
- Is more resistant to fires, floods, hurricanes, earthquakes and other disasters (when used with properly applied, high-quality fasteners – See page 20-21: Fastening System).

Steel wall panels, fastened to the wood frame, serve as vertical diaphragms to transfer lateral loads to the foundation below.

Steel is measured two ways:

- Thickness (specified in inches or gauge)
- Yield strength; the amount of force required to cause permanent deformation. Hardness or resistance to denting is a function of yield strength.

### Load Carrying Capabilities of Light Gauge Steel

Grade	Gauge	Thickness <small>in thousandths of inches. # shown is mid-point of tolerance range</small>	Yield Strength <small>(higher is better)</small>	Max. Uniform Load <small>(higher is better)</small>
Full-Hard	29	17.2	80,000 psi	160 psf
D-Grade	28	18.7	50,000 psi	122 psf
Commercial Quality	26	19.0	45,000 psi	132 psf

**KEY POINT:** Yield strength contributes more to the strength of the steel sheet than its thickness.



## WHAT TO LOOK FOR

### High Yield Strength

While the thickness of the steel is important, it is only one part of the equation. You want to make sure all the steel being used in your building is full-hard, high-yield strength steel. High-yield steel is nearly twice as hard as other steel and can improve the structural integrity of your building two ways:

- Provide greater resistance to impact damage from hail, rocks, etc.
- Facilitate heavier wind and snow loading.

### More Ribs–Stronger Steel

Generally, the more ribs (bins in the metal), the closer together, and the higher they are, the stronger the steel panel.

### Closer Rib Spacing–More Fasteners

Since builders attach the steel either at the ribs or the flat area next to the ribs, the closer the rib spacing, the greater the number of allowable fasteners.

### More Fasteners–Higher Structural Integrity

The more fasteners used, the stronger the connection between the steel in the building frame. (Read more about this under Adequate Quantity of Connectors on page 21.)

### High Quality Paint

Siliconized polyester coatings are commonly used, but do not provide the durability or color retention and resistance to fading and chalking of Kynar 500® brand coatings.



**Siliconized Polyester vs. Kynar 500 Coating.** When a shipment of Tudor Brown steel panels with siliconized polyester coating arrived at this Belpre, Ohio jobsite in 1994, nobody knew that two panels with Kynar 500 coating had accidentally gotten mixed in. But after a few years, it was obvious! The Kynar coated panels look as rich and dark as the day they were installed, but the siliconized polyester coated panels are only a shadow of what they once were.

**NOTE:** FBI was the first in our industry to use a Kynar 500® coating on all our steel panels.

## WHAT TO AVOID

### Lower Yield Strength (Soft Steel)

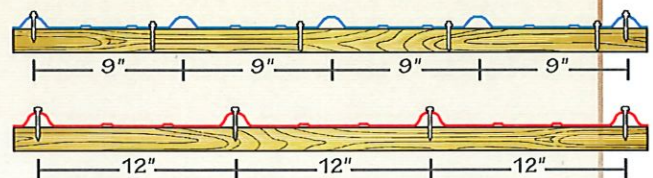
Steel hardness is equally as important as steel thickness. Together the thickness and the hardness contribute to steel's performance.

Thinner, harder steel can actually be stronger than thicker, softer steel. Plus, soft steel is more likely to lead to leaks and weaker connections over time due to fastener holes becoming enlarged. Soft steel is also likely to get more dings from hail, rocks or anything else that hits it.

### Wide Rib Spacing

All else being equal, the wider the rib spacing, the weaker the panel and the fewer allowable fasteners.

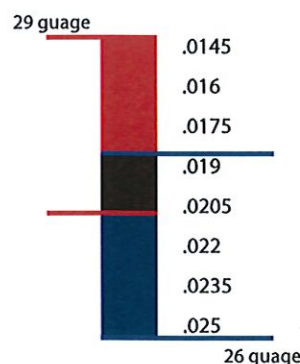
In addition, a shorter, squarer rib can be stronger than a higher, rounder rib. This is because of the increased number of bends in the steel, adding strength. As mentioned earlier, closer rib spacing also adds strength.



### Siliconized Polyester Coatings

Siliconized polyester coated steel will chalk and fade as time goes by.

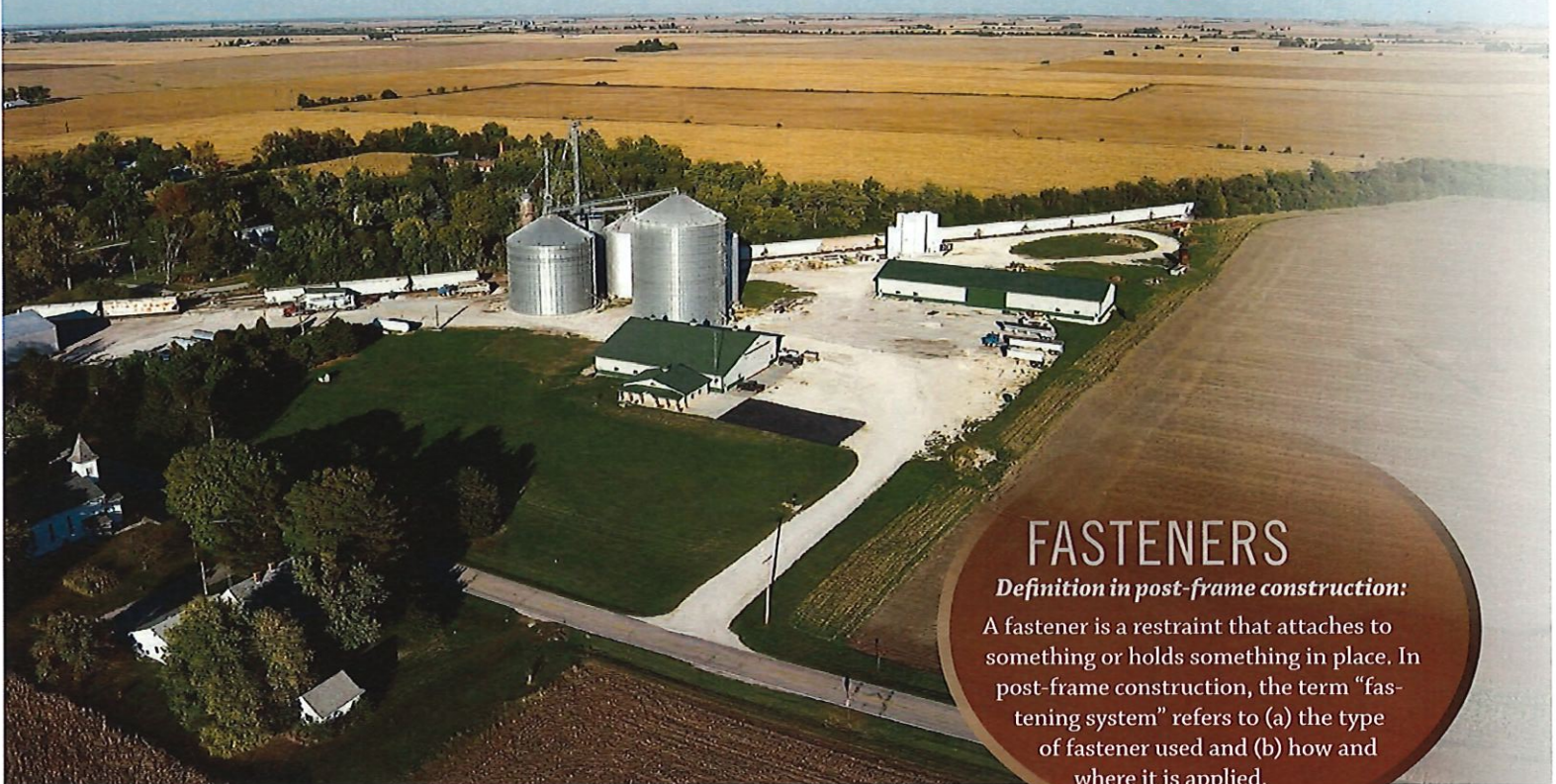
### Steel Thickness Variation (in inches)



Sheet steel thickness varies even within a specific gauge. This means that the variation between the maximum and minimum thickness could cause a sheet of 29 gauge steel and a sheet of 26 gauge steel to be the same thickness. This is why yield strength and load capacity are more important indicators of strength.



# How Fasteners Affect Structural Integrity



## FASTENERS

### *Definition in post-frame construction:*

A fastener is a restraint that attaches to something or holds something in place. In post-frame construction, the term "fastening system" refers to (a) the type of fastener used and (b) how and where it is applied.

**KEY POINT:** When comparing post-frame builders, it is important that you pay attention to the fastening systems being used to attach the steel siding and roofing; how and when the system is applied. You want to evaluate the different offerings before you buy.

### Proper Fastening and Transfer of Forces

When properly tied together and tied to the foundation, the shear walls and diaphragm elements give a building a tremendous resistance to lateral forces/lateral loads. These lateral forces are generally the result of wind or seismic forces acting horizontally on a building or the racking incurred during seismic events. Lateral loads are often misunderstood or ignored by builders and designers. This is not surprising due to the fact that there is nothing intuitive about lateral loads.

– Building in High Wind and Seismic Zones, ©1997 APA – The Engineered Wood Association

Because much of the post-frame building strength comes from the diaphragm of steel on the sides and roof, the more secure the steel is affixed to the wood framing, the stronger the building.

In addition, the ability of a shear wall to resist lateral loads requires a well-constructed roof diaphragm. The two work together to transfer lateral loads through the shear wall to the foundation. The effectiveness of the system is only as good as the quality and quantity of connections.

### What We Have Learned from Hurricanes

"In hurricanes, loss of roofing materials and sheathing is the leading cause of structural failure in wood framed buildings. The central reasons behind these failures are improper connection detailing between structural systems and inadequate fastening of sheathing to supporting members. Once the roof sheathing has been pulled off the roof framing, the diaphragm ceases to function and the load path has been interrupted.

– Building in High Wind and Seismic Zones, ©1997 APA – The Engineered Wood Association



## WHAT TO LOOK FOR

In this section, we will focus on attaching the diaphragm, this is where fastening system types and methods will vary the most.

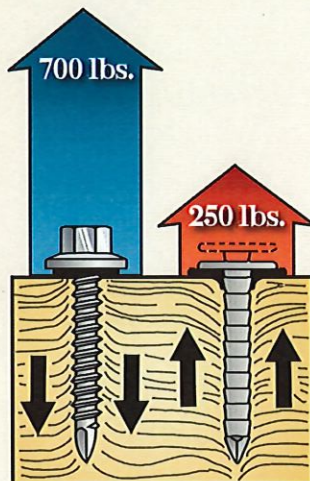
### Screws vs. Nails

Screws have superior holding power—more than 700 lbs. vs. 250 lbs. for nails. In post-frame buildings:

- Nails or the fastening system of choice for framing and provide excellent holding power.
- Screws are typically used to attach metal to wood on the sidewalls and on the roof. In addition, screws should be used to fasten OSB in the construction of sure walls.

If nails were used to fasten roofing steel, water would find its way in wherever the nail heads do not tightly cover the hole. Once fasteners loosen their grip on the wood—whether they are nails or screws—the building loses stiffness. Wind and other forces cause the building to move slightly. Each movement works the fastener against the steel, causing the original hole to grow. A nail hole gets larger faster than a screw hole. This is because the screw creates a smooth clean penetration (think of a drill) where nails create a jagged puncture that can tear easily.

With nails, more roof leaks will appear over time and existing leaks will get worse. Roof leaks lead to rotten wood that weaken the structure.



Wood fibers tend to return to their original position when a screw or nail is driven into the fibers. Nails push the wood fibers down while screw fasteners pull the wood fibers up. When the fibers try to return to their original position, they will push out a nail and pull a screw tighter.

**KEY POINT:** Since a post-frame building gets much of its strength from the steel panels, the tighter it is attached to the building, the better. Putting fasteners in the flat of the steel panels provides the tightest possible connection.

**Note:** Even the best-designed fastening system will only perform as well as the crew doing the installation. Follow the drawings and build the structure according to the specifications (a good reason to select an experienced, highly reputable builder.)

### Correct Placement of Screws for Tight Steel Connections

Two choices:

- Top of the rib: allows movement around the critical seal area potentially leading to leaks.
- Flat area between the ribs: provides a tighter, more secure connection between the steel and the wood.

### Protected Washer

The rubber washer is the last line of defense against leaks. Look for a fastener that encapsulates the washer, keeping it protected from the damaging effects of the sun's UV rays.

### Adequate Quantity of Connections

The greater quantity of connections, the stronger the building. But once you exceed the amount necessary to meet the engineering requirements, you're merely adding fasteners for additional peace of mind.

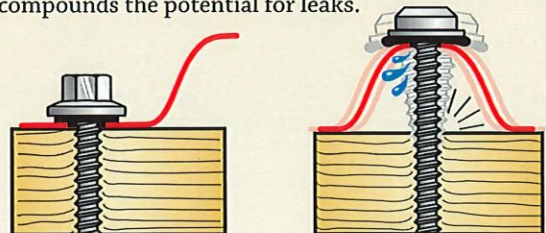
## WHAT TO AVOID

### Nails

When it comes to fastening steel to wood, nails provide a poor connection compared to screws.

### Fasteners Attached in Ribbed (vs. flat) Areas of Steel Panels

Installing the screw in the rib allows movement around the critical seal area, and that movement then compounds the potential for leaks.

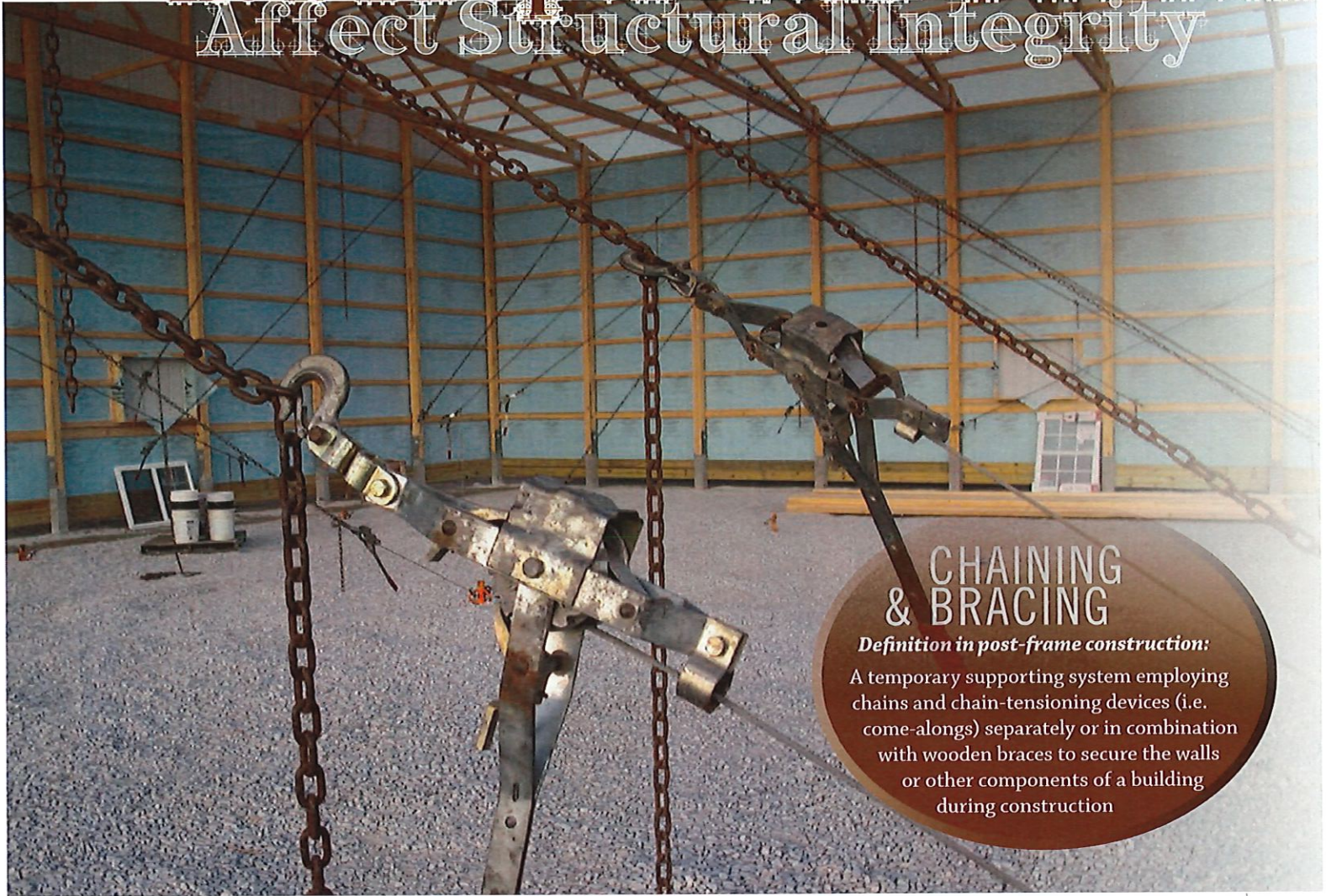


When a screw or nail is attached to the flat – instead of ribbed – area of a steel panel, a tighter connection is assured.

**Note:** Have you ever tried to pull a nail out of a board using your fingers? If the nail shank is only in the wood halfway, it is easy to remove the nail by wiggling it back and forth and pulling out. But if the nail is completely driven into the wood, you cannot get it out. In this example the building is like your fingers. Expansion, contraction and wind are constantly "trying" to work them free. The tight grip of the screw through the flat of the steel doesn't give these forces leverage, thus preventing roof leaks and preserving building strength.



# How Proper Construction Affect Structural Integrity



## CHAINING & BRACING

### *Definition in post-frame construction:*

A temporary supporting system employing chains and chain-tensioning devices (i.e. come-alongs) separately or in combination with wooden braces to secure the walls or other components of a building during construction

*Chaining and bracing is used to secure wall sections while roof trusses are set in place and to protect against weather conditions during the vulnerable stage of construction.*



*What can go wrong sometimes does. Be sure every precaution has been taken to avoid the cost and time loss associated with jobsite catastrophes.*



Every building is most vulnerable to storm damage and other accidents during construction. And your investment needs to be protected throughout the entire building process.

There are three critical aspects to risk management:

- A formalized and well documented chaining and bracing protocol
- A good plan for site cleanliness and safety throughout the building process
- Builders' risk insurance



# Practices

## WHAT TO LOOK FOR

### A Written Chaining and Bracing Plan

Ask to see your builders written engineered chaining and bracing plan.

Proper chaining and bracing secures the walls and other building components during construction. This can eliminate the need to fix mistakes, straighten or rebuild a building that has been structurally compromised by wind or other forces.

- **Transfer of the strong column-to-footer connection to the top of the sidewall through diagonal bracing**

Diagonal braces used on sidewalls create a triangle that transfers loads at the top of the column to the ground increasing structural integrity during construction.

- **Angle bracing installed at key intersecting points**

Building's weak points should be reinforced with angle bracing:

- Building corners
- Large door frameouts
- Strategic points along the endwalls and sidewalls

- **Anchor points that are independent of the building**

Be sure your builder understands the importance of strong anchor points that are independent of your building to reduce the risk of structural failure during construction:

- Helical anchors or poured concrete
- Connected to building with chains and binders

### A Clean and Safe Jobsite

Keeping the jobsite neat and orderly is critical to the safety of the construction workers as well as you, your employees and your family. Look for:

- A published safety record for the builder
- Well organized building material staging
- Proper and secure tool storage
- Daily cleanup of the site
- Posted safety signs (hardhat area)
- Construction crew wearing proper safety gear: fall protection, hardhats and eye protection, etc.
- A well braced and secure structure (chaining and bracing)

### Builders' Risk Insurance

It is in your best interest and the best interest of your builder that you insist your builder have builders' risk insurance. A builders risk policy:

- Saves time during construction trying to straighten or rebuild a compromised building
- Minimizes time spent and investment risks
- Eliminates your hassles and cost to settle insurance claims
- Eliminates conflict with your builders regarding who is responsible for damages
- Faster damage recovery

## WHAT TO AVOID

### • Inexperienced Builders Who Do Not Offer an Engineered Chaining and Bracing Plan

Be cautious if a builder tells you they will brace your building "same way they always brace buildings." Every building is unique. When selecting a builder, it's important to have confidence in their building process. The time spent by an experienced builder designing and executing an engineered bracing plan may prevent long delays and help keep your project on schedule.

### • Builders with No Safety Record

Accidents happen. Beware of builders who do not have a safety record. The builder you choose should have a published record. And the frequency of documented accidents should be below industry averages.

### • Builders Who Do Not Talk About Builders' Risk Insurance

What happens if a severe storm damages your new building during construction? Who is responsible for the damage? It's important that you or your builder have a builders' risk policy and know what it covers.



# STRUCTURAL INTEGRITY

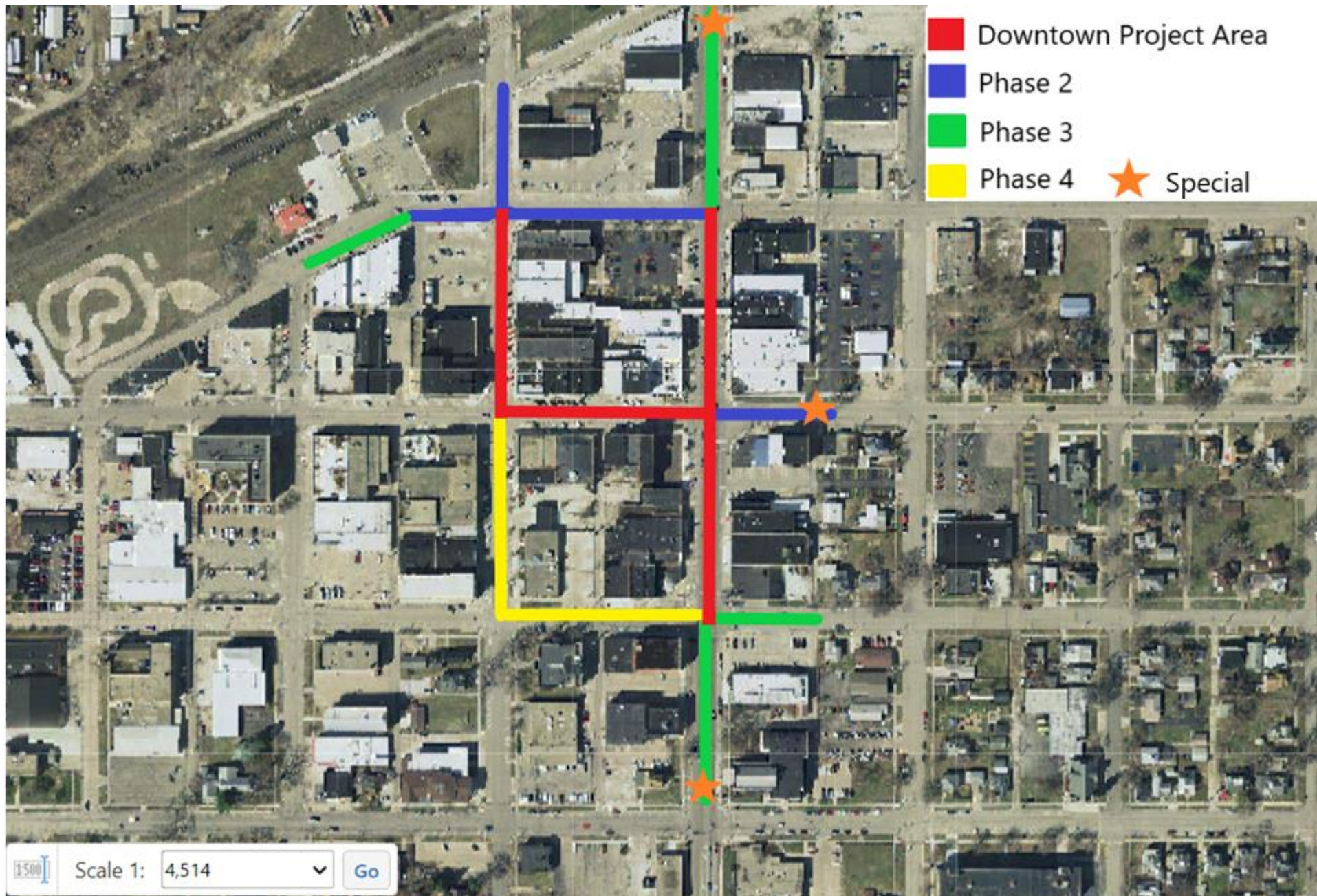
*in Post-Frame Construction*



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The City's grant application for capital improvements to the downtown area identified the streets in the traditional heart of the community that had the most visibility and commercial activity that could benefit from aesthetic improvements. Those streets were:

- ❖ Main St. – First St. to Third St. (2 blocks)
- ❖ Second St. – Main St. to Tremont St. (1 block)
- ❖ Tremont St. – Second St. to Third St. (1 block)

A logical extension of the process that identified those streets would indicate that they would have the same priority *if* the concept regarding lighting is that it is more impactful when concentrated. In the field of community and economic development, concentration is a significant concept. It's why downtowns, shopping centers, office parks, and industrial parks exist. It's why low-income housing projects have a more negative image than "scattered sight" programs in which the same number of units are dispersed throughout a community, and why we have certain programs that are established for targeted areas where synergy can be developed.

*If* the idea of Berrien Park serving as a central area for a static display, Christmas Village, or other type of activity is considered viable and is ultimately implemented, lighting the abutting streets and the most commercially viable route to it would be the most beneficial use of funds.

The third phase extends out to the north, south, and east to the areas typically considered as the borders to the downtown area and adds the block of 3<sup>rd</sup> Street from Tremont to Chestnut and half of the block on First Street from Main Street to Burr Street because of their viability and visibility as a destination for commercial activity that benefits from aesthetic enhancements, specifically restaurants and the movie theater.

The fourth phase would be First Street from Main Street to Tremont Street and Tremont Street from First Street to Second Street because they serve as a secondary route to the aforementioned areas, has fully developed block faces, and helps to complete one of the blocks in the downtown that is the most commercially oriented. Additional consideration should also be given to the lighting on Loomis from Main Street to Tremont Street, which has no commercial activity but would serve as an alternate route to Berrien Park and would abut what would likely serve as overflow parking.

Finally, stars are shown on the map to indicate the placement of special treatments or features. It's important to note that these items, whether archways, draped lights extending across the right of way, signs with messages such as "Season's Greetings," etc. are depicted in the image based on where they should be placed, *if acquired*, in the event all other applicable phases have been completed. If they are acquired and placed before Phase Three is completed, they should be placed at the north, south, and east limits of phase one. These treatments support the concept of a "gateway," which is an important concept in community and economic development because it provides a sense of arrival; an important concept if the goal is serving as a destination.

This should not be taken as a recommendation that the acquisition of lights be split into four phases, as anywhere from one to all of the phases could be completed at the same time if a decision is made to acquire the lights. It simply represents a categorization of the priority of placement *if* the decision to acquire lights results in a phased approach.