

**CITY OF MUSKEGO**  
**CHAPTER 30 - BUILDING CODE**

(Ord. #1222 - 04-20-2006)

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**CHAPTER I. - GENERAL**

**30.00 SCOPE**

The provisions of the **MUSKEGO MUNICIPAL BUILDING CODE** shall govern the design, construction, alteration, and demolition of all buildings and structures within the City of Muskego, except that this Code shall not apply to **AGRICULTURAL BUILDINGS** as defined by Chapter 30, Section 30.12(1) other than farm residences.

**30.01 TITLE**

These regulations shall be known and cited as "**Muskego Municipal Building Code**" and shall be construed to secure their expressed intent and to ensure public safety, health and welfare insofar as they are dependent upon building construction.

**30.02 APPLICATION OF "WISCONSIN ADMINISTRATIVE BUILDING AND HEATING, VENTILATING AND AIR CONDITIONING CODE".**

The Wisconsin Administrative Building and Heating, Ventilating and Air Conditioning Code, Chapter COMM 61-65 and the Wisconsin Enrolled Commercial Building Code Volumes 1 and 2, all inclusive and all amendments thereto, are hereby made a part of this Code by reference with respect to those classes of buildings to which such provisions apply. A copy of said code is on file in the office of the Clerk-Treasurer.

**30.03 APPLICATION OF "WISCONSIN UNIFORM DWELLING CODE".**

The Wisconsin Uniform Dwelling Code, Chapters 20 through 25, inclusive and all amendments thereto and the Wisconsin Uniform Building Code, are hereby made a part of this Code by reference and shall apply to all one and two family dwellings and alterations and additions thereto. For purposes of this Code the Wisconsin Uniform Building Code shall apply to alterations and additions to all one and two family dwellings constructed prior to the effective date of the Wisconsin Uniform Dwelling Code. A copy of said code is on file in the office of the Clerk-Treasurer. (Ord. #1312 -02-04-2010)

**30.04 APPLICATION OF "MUSKEGO MUNICIPAL BUILDING CODE".**

All buildings and structures hereafter erected, altered, repaired, moved or demolished that are used or designed to be used for the purpose herein defined shall comply in full with the requirements of this Code.

(1) ZONING LAWS

No provision of this Code shall be construed to repeal, modify or constitute an alternative to any lawful zoning regulations.

(2) NEW BUILDINGS

The construction requirements of the Muskego Municipal Building Code shall apply to all buildings not covered under Section 30.02, with the exception of AGRICULTURAL BUILDINGS (see Section 30.00 - SCOPE).

(3) EXISTING BUILDINGS

This Code shall also apply to buildings and conditions described in this section.

- (a) CONVERSION TO ONE OR TWO FAMILY DWELLING - An existing building to be occupied as a one or two family dwelling which building was not previously so occupied.
- (b) REPAIR OF AN EXISTING STRUCTURE - An existing structure that is repaired, when the cost of such repairs during the life of the structure exceeds fifty (50) percent of the equalized value of the structure, said value to be determined by the assessor. Note: *Repair work* which *does not* exceed 50% of the equalized value of the existing structure shall be required to comply with the code that was in effect when the component or work was originally constructed. In cases where the exact date of construction cannot be determined or in the event a copy of the code for that particular period cannot be located, the Building Inspector shall determine the applicable code.

When determining cost of repairs, only structural work which extends the life of the structure shall be included, such as: rafters, decking, headers, foundations, studs, etc. Items which are non-structural such as doors, windows, plumbing, electrical, carpet, paint and trim, shall not be included.

- (c) ADDITIONS AND ALTERATIONS - Additions and alterations, regardless of cost, made to an existing building shall comply with the requirements of this Code. The provisions of subsection (4) of this section shall also apply.
- (d) ROOF COVERINGS - Roof Coverings - Whenever more than twenty-five (25) percent of the roof covering of a building is replaced in any twelve-month period, all roof covering shall be in conformity with applicable sections of this Code.

(4) ALTERATIONS AND REPAIRS

The following provisions shall apply to buildings altered or repaired:

- (a) Alterations - Alterations to any existing building or structure, accommodating a legal occupancy and use, but of non-conforming type of construction which involves either the structural members of floors or roofs, beams, girders, columns, bearing or other walls, room arrangement, heating and air conditioning systems, insulation or energy efficiency, light and ventilation, changes in location of exit stairways or exits or any of the above, shall be made to conform to the minimum requirements of this Code, applicable to such occupancy and use and given type of construction.

- (b) Repairs - Repairs for purposes of maintenance, or replacements in any existing building or structure which do not involve the structural portions (load bearing or non-load bearing) of the building or structure, or which do not effect room arrangement, light and ventilation, access to or efficiency of any exit stairways or exits, fire protection, heating or air conditioning, insulation or energy efficiency, plumbing, electrical, or exterior aesthetic appearance and which do not increase a given occupancy and use, shall be deemed minor repairs, exempt from plan submittal requirements.
- (c) Alterations and Repairs Required - When any of the structural members of any building or structure have deteriorated from any cause whatsoever, to less than their required strength, the owner of such a building or structure shall cause such structural members to be restored to their required strength; failing in which the building or structure shall be considered a menace to public safety and shall be vacated and thereafter no further occupancy or use of the same shall be permitted until the regulations of this Code are complied with.
- (d) Extent of Deterioration - The amount and extent of deterioration of any existing building or structure shall be determined by the Building Inspector.
- (e) Use of Unsanitary Building - It shall be unlawful to occupy or use or permit the occupancy or use of any building or structure that is unsanitary or dilapidated, or deteriorated, or out of repair, thereby being unfit for human habitation, occupancy or use until the regulations of this Code have been complied with.

**CHAPTER II. - DEFINITIONS**

**30.05 GENERAL**

DEFINITIONS: - For purposes of this Code, the definitions listed below and those found in COMM 20.07 shall apply. Exception: All definitions found in COMM 20.07 referencing “DWELLING” or “DWELLING UNIT”, shall also apply to all other non dwelling, non commercial or non agricultural structures within the City.

(1) AGRICULTURAL STRUCTURE

A building located on a parcel of 35 acres or more of contiguous land which is devoted primarily to agricultural use as defined by s.91.01(1), Wis.Stats., and which during the year preceding, produced gross farm profits, as defined in s.71.58(4), Wis.Stats., of not less than \$6,000 or which, during the 3 years preceding, produced gross farm profits, as defined in s.71.58(4), Wis.Stats., of not less than \$18,000; or a parcel of 35 or more acres of which at least 35 acres are enrolled in the farmland preservation program. Note: In addition to the above criteria, commentary issued from time to time by COMM may also be utilized when determining qualifications for agricultural structure exempt status.

(2) BUILDING

Any structure used, designed or intended for the roofed, shelter, enclosure or protection of persons, animals or property of any kind.

(3) BUILDING INSPECTOR

The Director of Building Inspection or other duly authorized individual.

(4) COST OF PROPOSED WORK- See "Value of proposed work".

(5) EQUIPMENT

As specifically regulated by this Code, includes heating, cooling, air conditioning, and ventilation systems; plumbing and sanitary systems; electric and power systems; telephone, electronic and radio signal and annunciator systems; dry cleaning, dyeing and washing machines; elevators and dumb waiters; gas pipe systems; standpipes; sprinkler systems; fire protection apparatus, fire extinguishers, and pumps, oil burners, stokers, and conveyors; refrigerating systems; devices, machinery and apparatus of every description; furnace(s), boiler(s); high or low pressure steam systems; gasoline pumps; all movable or portable containers of every description; all pressure vessels or other tanks; and all other self-contained systems used in conjunction with buildings or structures.

(6) STRUCTURE

As specifically regulated by this Code, Structure shall have the meaning as defined by the Muskego Municipal Code, Chapter 17, Section 22.03. (Ord. #1248 – 02/01/2007)

(7) VALUE OF PROPOSED WORK

For purposes of this Code, cost or value of proposed work shall mean the fair market or retail value of the work as would be charged by a professional contractor if competitive bids were obtained. In no case shall value of proposed work or cost of proposed work mean the actual cost to the property owner or permit applicant to acquire the materials and perform the work.

- (a) In the case of a non-conforming structure affected by the 50% equalized value rule, [see: 30.04(3)(b)], the value of the work shall include only structural work which extends the life of the structure such as: rafters, decking, headers, foundations, studs, etc. Items which are non-structural such as doors, windows, plumbing, electrical, carpet, paint and trim, shall not be included.

(8) WRECKING

For purposes of this Code, wrecking shall include demolition, dismantling or tearing down of framing members, whether weight bearing or not, and shall not include the removal of gypsum wallboard, paneling or other similar surface coverings.

**CHAPTER III. - BUILDING INSPECTOR AND PERMITS**

**30.06 BUILDING INSPECTOR**

There is hereby created the Department of Building Inspection. The Director of Building Inspection, hereafter referred to as Building Inspector, appointed by the Municipality, shall act as head of this department.

(1) DUTIES

The Building Inspector is vested with the authority and responsibility to enforce all laws controlling safe building construction. He shall make inspections at the site of buildings damaged, by any cause whatsoever, to determine the safety of buildings affected thereby. The Fire Inspector shall have primary responsibility to make periodic inspection of existing public buildings to determine their safety.

(2) AUTHORITY

The Building Inspector, or his duly authorized agent, shall have the power and authority, at all reasonable hours, for any proper purpose, to enter upon any public or private premises and make inspection thereof and to require the production of the permit for any building or plumbing, or electrical, or heating, or air conditioning work being done, or the required license therefore. No person shall interfere with or refuse to permit access to any such premises to the above described representatives of the municipality while in the performance of their duties [see 30.07(5)(a)7].

In cases where access has been denied the Building Inspector may obtain a special inspection warrant or a criminal search warrant as applicable [see 30.10(9)].

(3) RECORDS

There shall be kept, in the Department of Building Inspection, a record of all applications for building permits in a book for such purpose and each permit shall be regularly numbered in the order of its issue. Also, a record showing the number, description size of all buildings erected indicating the kind of materials used and the cost of each building and aggregate cost of all buildings in the various classes, shall be kept. There shall be kept, in the Department of Building Inspection, a record of all inspections made of all removal and condemnation of buildings and a record of all fees collected showing the date of their receipt. The Building Inspector shall make a written annual report to the governing body of the municipality relative to these matters.

**30.07 PERMITS**

(1) PERMITS REQUIRED (Ord. #1312 – 02-04-2010)

No building or structure, or any part thereof, shall hereafter be built, enlarged, altered or demolished within the municipality or moved into, within or out of the municipality except as hereinafter provided, unless a permit therefore shall first be obtained by the owner or his agent from the Building Inspector.

Permits required are as follows:

- (a) Building
- (b) Air conditioning
- (c) Wrecking, demolition or razing (includes bearing or non-bearing walls)
- (d) Heating

- (e) Occupancy
- (f) Re-roofing and residing
- (g) Pools/Spas
- (h) Other permits as required by governing municipality and/or as listed in the Table No. 1 permit fee schedule.

(2) APPLICATION FOR PERMITS

Application for a permit shall be made in writing upon a blank form to be furnished by the Building Inspector and shall state the name and address of the owner of the building and the owner of the land on which the work is to be performed, the name and address of the contractor, the house number thereof and such other information as the Building Inspector may require. With such application, there shall be submitted, to the Building Inspector, three (3) complete sets of plans, specifications and three (3) copies of a survey (commercial projects) and two (2) complete sets of plans, specifications and two (2) copies of a survey (non-commercial).

- (a) Survey - Shall meet all requirements of Muskego Municipal Code, Chapter 18, Section 18.33, or as approved by the Engineering/Building Inspection Director.
- (b) Plans and Specifications - All plans shall be drawn to a scale not less than one-fourth (1/4) inch per foot, on paper or cloth in ink, or by some other process that will not fade or obliterate, and shall disclose the existing and proposed provisions for water supply, sanitary sewer connections and surface water drainage. All dimensions shall be accurately figured. Drawings that do not show all necessary detail shall be rejected. A complete set of plans for residential construction shall consist of:
  - 1. All elevations
  - 2. All floor plans
  - 3. Footing to roof wall cutaway, including foundation wall height
  - 4. Complete construction details
  - 5. Beam type, size and header sizes
  - 6. Openable area of windows and glass area
  - 7. Door sizes and swing direction
  - 8. Intended room use labeled - example: bedroom, utility, etc.
  - 9. Lumber type - example: SPF, Douglas Fir, etc. and Fb rating -- example: 1200, 2100, etc. (obtain from lumber supplier)

10. TJI - Micro-lam - or other similar component - provide: manufacturer and size
11. Fireplace details (3/4 inch per foot) showing cross section of fireplace and flues
12. Plans of garage when garage is to be built immediately or location of garage when it is to be built at a later date. All plans shall remain on file in the office of the Building Inspector until at least one (1) year after the completion of the building, after which time the Building Inspector may return the same to the owner, may keep them for public record or may destroy them.

(3) WAIVER OF SOME REQUIREMENTS

At the option of the Building Inspector, plans, data, specifications and survey need not be submitted with an application for permit to execute minor alterations and repairs to any building, structure or equipment, provided the proposed construction is sufficiently described in the application for permit.

- (4) DRAINAGE - Shall be governed by Muskego Municipal Code, Chapter 17, Section 5.10. (Ord. #1248 – 02/01/2007)

(5) INSPECTOR MAY REVOKE PERMITS. (Ord. #1248 – 02/01/2007)

(a) The Building Inspector or his designee may revoke any permit, certificate of occupancy or approval issued under the regulations of this Code and may stop business use, construction, demolition or use of approved materials, equipment, methods of construction, devices or appliances for any of the following reasons:

1. Whenever there is a violation of any regulation of this Code or of any other ordinance, law or lawful orders or Wisconsin Statute relating to the same subject matter.
2. Whenever the continuance of any construction or demolition becomes dangerous to life or property.
3. Whenever there is any violation of any condition or provision of the permit.
4. Whenever, in the opinion of the Building Inspector, there is inadequate supervision provided on the job site.
5. Whenever any false statement or misrepresentation has been made in the application for permit, plans, drawings, data, specifications or certified lot or plot plan on which the issuance of the permit or approval was based.
6. Whenever there is a violation of any of the conditions of an approval or occupancy given by the Building Inspector for the use of any new materials, equipment, methods of construction devices or appliances.
7. Whenever the property owner fails to allow reasonable inspections of the property.

- 8. Whenever any conditions of approval from City Boards and Committees are not being met for the building site or structure itself, including Planning Commission approvals.
  - (b) The notice revoking a permit, certificate of occupancy or approval shall be in writing and shall be served upon the applicant for the permit, owner of the premises and his agent, if any, and on the person having charge of construction.
  - (c) A revocation placard shall also be posted upon the building structure, equipment or premises in question by the Building Inspector.
  - (d) After the notice is served upon the persons as aforesaid and posted, it shall be unlawful for any person to proceed thereafter with any business use, construction or demolition operation whatsoever on the premises and the permit and/or certificate of occupancy which has been so revoked shall be null and void and before any construction or operation is again resumed, a new permit and/or certificate of occupancy, as required by this Code, shall be procured and fees paid therefore and thereafter the resumption of any construction or operation shall be in compliance with the regulation of this Code.

(6) FEES

Before receiving a permit, the owner or his agent shall pay the fee specified in Table 1 as from time to time established by Resolution of the Common Council. In applying, the provisions of this Code, in respect to new work, existing buildings, alterations and repairs, the value of the work shall be determined by the Building Inspector on the basis of current market costs.

(7) MUNICIPAL PROJECTS - Fees are waived for all municipal funded projects.

(8) NO PERMITS TO VIOLATORS

Applicants having outstanding orders, or notices, or unpaid fees or forfeitures, relative to this Chapter or other Chapters enforced by the City shall not be issued any additional permits, prior to such orders, or notices, or unpaid fees or forfeitures being corrected or paid to the Building Inspection Departments satisfaction.

- (a) Exception: The Building Inspector may issue permits to applicants with outstanding orders, or notices, or unpaid fees or forfeitures, when the permit is required to comply with an outstanding order, or notice.

**30.08 APPROVED PLANS**

- (1) A weather resistant card, signed by the Building Inspector, indicating the permit has been issued shall be posted at the job site in clear view during construction. After issuance of a building permit, the approved plans shall not be altered unless any proposed change is first approved by the Building Inspector as conforming to the provision of this Code.

(2) EXPIRATION OF PERMIT

- (a) Existing buildings and any alterations or additions thereto, new commercial buildings, accessory buildings and accessory structures.

Any permit shall become void unless operations are commenced within **four (4) months** from the date the permit is issued or if the building or work authorized by such permit is suspended at any time after work is commenced, for a period of more than **sixty (60) working days**. All work shall be completed within eighteen (18) months from the date the permit is issued. Time periods referenced herein may be extended by the Building Inspector if the delay was due to conditions beyond the control of the applicant. No additional permits for the same work will be issued unless a timetable of completion is agreed upon by the Building Inspector. Failure to comply with the agreed upon timetable may result in the revocation of the permit and the issuance of a citation for the offense.

- (b) New one or two family dwellings.

The permit shall expire twenty-four (24) months after issuance if the dwelling exterior has not been completed (new one or two family construction only).

- (3) Before any work is commenced or recommenced after the original permit has lapsed or been revoked, a new permit shall be issued at 50% of the original fee (any additional proration of the fee shall not be permitted). Permits issued in this manner shall expire 6 months from date of issue.
- (4) Non-transferability of Permits - Permits issued under this Code shall be non-transferable from one permit holder to another. In cases where a contractor has applied for and obtained a permit, commenced construction and for any reason whatsoever has abandoned or ceased activity on the project, or has been removed from the project by the property owner, a new permit must be obtained by the contractor hired to finish the work. Upon the property owners written request for a new permit, and prior to the issuance of the new permit, the property owner must schedule an inspection to determine the status of the job at the time the contractors (permit applicants) were switched. In all such situations, there shall be no refund of the original fee. The new applicant shall make application for and purchase a new permit, which shall be assessed fees at the discretion of the Building Inspector (proration of the fee shall be permitted). (Ord. #1312 – 02-04-2010)
- (5) Consent to Inspection or Permit Conditions - The acceptance by an applicant of any permit issued under this Code shall constitute the consent by such applicant and, if different, the owner or owners thereof to any inspections required or permitted under this Code or any permit conditions imposed as a condition of approval of the permit, or other applicable legal requirements.

### **30.081 REGULATIONS FOR MOVING BUILDINGS (Ord. #1007 - 12-02-99)**

- (1) GENERAL

No person shall move any building or structure upon any of the public right of ways of the municipality without first obtaining a permit therefor from the Building Inspector and upon the payment of the required fee. Every such permit issued by the Building Inspector for the

moving of a building shall designate the route to be taken, the conditions to be complied with, and shall limit the time during which said moving operations shall be continued.

(2) MOVING DAMAGED BUILDINGS:

No building shall be repaired, altered or moved within or into the municipality that has deteriorated or has been damaged by any cause, (including such moving and separation from its foundation and service connections in case of moved buildings), fifty (50) per cent or more of its equalized value, and no permit shall be granted to repair, alter or move such building within or into the municipality.

(3) CONTINUOUS MOVEMENT:

The movement of buildings shall be a continuous operation during all the hours of the day, and day by day and at night, until such movement is fully completed. All of such operations shall be performed with the least possible obstruction to thoroughfares. No building shall be allowed to remain overnight upon any street crossing or intersection, or so near thereto as to prevent easy access to any fire hydrant or any other public facility. Lighted lanterns shall be kept in conspicuous places at each end of the building during the night.

(4) STREET REPAIR

Every person receiving a permit to move a building shall within one day after said building reaches its destination, report that fact to the Building Inspector who shall thereupon in the company of the municipal highway commissioner, inspect the streets and highways over which said building has been moved and ascertain their condition. If the removal of said building has caused any damage to any street or highway, the person to whom the permit was issued shall forthwith place them in good repair as they were before the permit was granted. On the failure of the said permittee to do so within ten (10) days thereafter to the satisfaction of the governing body, said body shall repair the damage done to such streets and hold the person obtaining such permit and the sureties on his bond responsible for the payment of same.

(5) CONFORMANCE WITH CODE

No permit shall be issued to move a building within or into the municipality and to establish it upon a location within the said municipality until the Building Inspector has made an investigation of such building at the location from which it is to be moved, and is satisfied from such investigation that said building is in a sound and stable condition and of such construction that it will meet the requirements of this Building Code in all respects. A complete plan of all further repairs, improvements and remodeling with reference to such building shall be submitted to the Building Inspector, and he shall make a finding of fact to the effect that all such repairs, improvements and remodeling are in conformity with the requirements of this Building Code, and that when same are completed, the building as such will so comply with said Building Code. In the event a building is to be moved from the municipality to some point outside the boundaries thereof, the provisions with respect to the furnishing of plans and specifications for proposed alterations to such building, may be disregarded.

(6) BOND

- (a) Before a permit is issued to move any building over any public way in this municipality, the party applying therefor shall give a bond to the municipality in a sum to be fixed by the Building Inspector and which shall not be less than One Thousand (\$1,000) Dollars; said bond to be executed by a corporate surety or two personal sureties to be approved by the governing body or designated agent conditioned upon, among other things, the indemnification to the municipality for any costs or expenses incurred by it in connection with any claims for damages to any persons or property, and the payment of any judgment together with the costs and expenses incurred by the municipality in connection therewith, arising out of the removal of the building for which the permit is issued.
- (b) Unless the Building Inspector, upon investigation, shall find it to be a fact that the excavation exposed by the removal of such building from its foundation shall not be so close to a public thoroughfare as to permit the accidental falling therein of travelers or the location, nature and physical characteristics of the premises and the falling into such excavation of children under 12 years of age unlikely, the bond required by (a) shall be further conditioned upon the permittee erecting adequate barriers and within forty-eight (48) hours, filling in such excavation or adopting and employing such other means, devices or methods approved by the Building Inspector and reasonably adopted or calculated to prevent the occurrences set forth herein.

(7) INSURANCE

The Building Inspector shall require in addition to said bond above indicated, public liability insurance covering injury to one person in the sum of not less than One Hundred Thousand (\$100,000) Dollars and for one accident in a sum not less than Two Hundred Thousand (\$200,000) Dollars, together with property damage insurance in a sum not less than Fifty Thousand (\$50,000) Dollars, or such other coverage as deemed necessary.

(8) PLAN COMMISSION \*OR OTHER ASSIGNED BOARD OR COMMISSION

- (a) No such permit shall be issued unless it has been found as a fact by the Plan Commission\* of the municipality by at least a majority vote, after an examination of the application for the permit which shall include exterior elevations of the building and accurate photographs of all sides and views of the same, and in case it is proposed to alter the exterior of said building, plans and specifications of such proposed alterations and after a view of the building proposed to be moved and of the site at which it is to be located, that the exterior architectural appeal and functional plans of the building to be moved or moved and altered, will not be so at variance with either the exterior architectural appeal and functional plan of the buildings already constructed or in the course of construction in the immediate neighborhood, or the character of the applicable district established by the zoning ordinances of the municipality, or any ordinance amendatory thereof or supplementary thereto, as to cause a substantial depreciation in the property values of said neighborhood within said applicable district. In case the applicant proposes to alter the exterior of said building after moving the same, he shall submit with his application papers, complete plans and specifications for the proposed alterations. Before a permit shall be issued for a building to be moved and altered, the applicant shall give a bond to the municipality's Plan Commission\*, which shall not be less than \$1,000 to be executed

in the manner provided in subsection (6) hereof to the effect that he will within a time to be set by the Plan Commission\*, complete the proposed exterior alterations to said building in the manner set forth in his plans and specifications. This bond shall be in addition to any other bond or surety, which may be required by other applicable ordinances of the municipality. No occupancy permit shall be issued for said building until the exterior alterations proposed to be made have been completed.

- (b) Upon application being made to be Building Inspector he shall request a meeting of the Plan Commission\* to consider applications for moving permits which he has found comply in all respects with all other ordinances of the municipality. The Plan Commission\* may, if it desires, hear the applicant for the moving permit in question and/or the owner of the lot on which it is proposed to locate the building in question, together with any other persons, either residents or property owners, desiring to be heard, giving such notice of hearing as they may deem sufficient. Such hearing may be adjourned for a reasonable length of time, and within forty-eight (48) hours after the close of the hearing, the Plan Commission\* shall, in writing, make or refuse to make, the finding required by subsection (8) hereof, and file it in the office of the clerk, who shall send a copy of it to the Building Inspector.

**30.09 RAZING OF BUILDINGS (Ord. #1045 – 10-19-00)**

(1) RAZING OF BUILDINGS

The Building Inspector is hereby authorized to act for the municipality under the provisions of Section 66.0413 of the Wisconsin Statutes, relating to the razing of buildings and all acts amendatory thereof and supplementary thereto. The Clerk Treasurer is authorized to place the assessment and collect the special tax as there in provided.

- (2) Before a building can be demolished or removed, the owner or agent shall notify all utilities having service connections to or within the building, such as water, electric, gas, sewer and other connections. A permit to demolish or to remove a building shall not be issued until it is ascertained that service connections and appurtenant equipment, such as meters and regulators, have been removed or sealed and plugged in a safe manner. Excavations shall be filled with solid fill to match lot grade within five (5) days of removal of the structure. Any excavation shall be protected with appropriate fences, barriers and/or lights. Site restoration shall be performed pursuant to City of Muskego Municipal Code, Chapter 29, Erosion Control Ordinance requirements.

**30.091 DEMOLITION (Ord. #1045 - 10-19-00)**

(1) PURPOSE AND SCOPE

This section is intended to protect the Public Health and Safety during the demolition of any structure within the City of Muskego.

(2) AUTHORITY

- (a) The building inspector is authorized to review, impose conditions, and issue demolition permits and regulate demolition for all type A, A1, B, B1, C, and C1 structures, as defined below.

- (b) The building inspection department is authorized to review, impose conditions, and issue demolition permits for Type D and D1 structures subject to Public Service Committee approval for which a written recommendation from Building inspection to the committee is required.
- (c) A demolition permit will not be required for Internal Demolition if associated with a remodeling permit or other permitted building improvements.

(3) DEFINITIONS

- (a) Story: surface area of space at least 6' 6" high and excludes basement or crawl spaces.
- (b) WDOT: State of Wisconsin Department of Transportation Standard Specifications for Highway and Structure construction.
- (c) NR: Department of Natural Resources Administrative Codes.
- (d) Comm: Department of Commerce Administrative Codes.
- (e) Types of Structures:

**Type A:** Storage sheds, agricultural use buildings and garages equal to or greater than 1000 s.f. and less than 10 feet from property line or another structure.

**Type A1:** Storage sheds, agricultural use buildings and garages less than 1000 s.f. and equal to or greater than 10 feet from property line or another structure.

**Type B:** Single or two family dwelling unit(s) less than 3000 s.f. and less than 10 feet from property line or another structure.

**Type B1:** Single or two family dwelling unit(s) less than 3000 s.f. and equal to or greater than 10 ft. from property line or another structure.

**Type C:**

1. Single or two family dwelling unit(s) equal to or greater than 3000 s.f. and less than 10 feet from property line or another structure.
2. Three or more dwelling unit structures less than 10 feet from property line or another structure.
3. Commercial and Industrial structures <5000 s.f. and less than 10 feet from property line or another structure.

**Type C1:**

1. Single or two family dwelling unit(s) equal to or greater than 3000 s.f. and equal to or greater than 10 feet from property line or another structure.
2. Three or more dwelling unit structures equal to or greater than 10 feet from property line or another structure.

3. Commercial and Industrial structures <5000 s.f. and equal to or greater than 10 feet from property line or another structure.

**Type D:** Commercial and Industrial structures =>5000 s.f. and less than 10 feet from property line or another structure.

**Type D1:** Commercial and Industrial structures =>5000 s.f. and equal to or greater than 10 feet from property line or another structure.

(4) ADMINISTRATION OF DEMOLITION

(a) Fee Structures

1. Structures less than 5000 s.f. and less than 40' in height: Per Table #1 as amended from time to time by the Common Council
2. Structures => 5000 square foot or => 40' in height: Per Table #1 as amended from time to time by the Common Council

(b) Field inspections required at the following events:

1. Prior to commencement for site preparation compliance
  - a. Including sealing and locating utilities.
  - b. Including removal of underground storage tanks and before backfilling.
2. After removal of sub structures and before backfilling.
  - a. Including response to complaint from adjacent occupants during demolition.
3. Upon restoration and removal of final access barriers.

(c) Bonds

1. Performance bond is required for demolition of type D and D1 structures in the amount of \$2.50/square foot of structure.

(d) Liability

1. The Property owner and/or their agent(s) shall be responsible for all damage, losses or nuisances caused by demolition activity and restoration and maintenance thereof despite issuance and review of the demolition permit application by the city's building inspection department.
2. Insurance for bodily injury and property damage will be required as follows:
  - a. Type D and D1 structures \$1,000,000.
  - b. Type C and C1 structures \$500,000.

(e) Schedules

1. Time for demolition from issuance of the permit to completion of site restoration shall be before one calendar year.

2. Time extension may be granted for extenuating circumstances by building inspection, however, the demolition shall also be subject to any new regulations and/or conditions of the permit enacted since original issue date of the permit.
3. Actual time given from moment demolition commences to the complete restoration of the site shall be:
  - a. 6 calendar months for Type D structures.
  - b. 3 calendar months for Type C structures.
  - c. 1 calendar month for all others.
- (f) Appeals may be sought as per City Ordinance, Chapter 30.
- (g) If any part of this ordinance is found to be invalid, it shall not invalidate the rest of ordinance.

#### (5) SUBMITTALS AND SITE PREPARATION

- (a) Limited access to site with 4 foot minimum height perimeter fencing will be required for demolition of Type B, C, C1, D, D1 structures.
- (b) Freon removal from Type C, C1, D, D1 structures will be in accordance to Comm regulations. Asbestos Removal from Type B, B1, C, C1, D, D1, structures will be in accordance with DNR Sections 4.06, 4.07 and 4.08
- (c) For type B, B1, C, C1, D and D1 whose structure tax value is over \$50,000 and over 50 years old will comply with COMM 53, unless waived by the City of Muskego Common Council.
- (d) State Statutes to be complied with:
  1. DNR NR 404(3), for secondary air attainment standards are to be met at property line if said Type D structure is within 200 ft. of the property line.
  2. Dust Control for Type B, B1, C, C1, D, D1 shall be in accordance with NR 404(3) for secondary particulate emissions including; Crushed stone access drives for haul vehicles and wetting down disturbed areas as needed. A water truck and spray may be required on site as directed by Building Inspection Department.
  3. Fuel tanks removal for C, C1, D, D1 structures shall be in accordance with COMM 47.
  4. Structure C, C1, D, D1 demolition on previous waste disposal sites shall be subject to applicable DNR regulations.
  5. Structure demolition within well head protection zones shall be subject to the City's well head ordinance regulations and said demolition plans shall meet the approval of the Utility Committee.

6. Well(s) shall be abandoned in accordance with NR 507.
  7. Disposal Sites shall be State approved sites only for Type C, C1, D, D1 materials.
  8. The following monitoring is required for Type D, D1 structures if toxicants are found or known to be present in the Structure(s).
    - a. Air Quality; If said structure is within 200 feet of it's adjacent property lines air sampling bags shall be placed at all four compass directions at property line for the duration of demolition and be sampled once per month until demolition is complete. The operation shall not generate dust exceeding NR 404 (3) for secondary particulate levels.
    - b. Ground water monitoring is required if the structure to be demolished is less than 200 ft from a property line in granular or silty soils or 50' in clayish soils. A monitoring well downstream of structure at property line shall be installed as per NR 507 and sampled accordingly:
      - (i) Sample 1 week before commencement of demolition.
      - (ii) Sample at end of demolition.
      - (iii) Abandon the monitoring well as per NR 507 requirements.
  9. Ground water monitoring is not required for internal demolition.
  10. Other toxicant identification for (Type D, D1), structures shall be removed in accordance with the applicable state and federal laws.
    - a. The method of removal of materials on EPA and DNR toxicity list (including Lead Removal) shall meet the Approval of EPA and DNR prior to issuance of permit.
    - b. When Toxic Organic matter is found the recommendation from recognized industrial hygienist shall be met.
- (e) City requirements for demolition:
1. Vibration for Type D structure demolition shall be less than 4 on Richter Scale at the nearest property line of the structure if said structure is within 100 feet of any of its property lines.
  2. Adjacent structures, pedestrian and vehicular traffic shall be protected from flying debris in the demotion of Type B, B1, C, C1, D, D1 if the structure to be demolished is within a distance equal to height of structure to be demolished.
  3. Flying debris protection shall be required between any structure or public passageway to be demolished. If a structure or passageway is closer than initial height of building and shall be of a height to be at least 8 ft. and withstand wind loads of 20 p.s.f.

## (6) PHYSICAL REMOVALS

- (a) All basement footings, floors and walls shall be removed.
- (b) Existing utility laterals and services shall be located and disconnected before demolition commences. A 2" x 4" post at terminal of each utility service shall be placed at the point of discontinuance.
- (c) Partial removal of Type B, B1, C, C1, D, D1 structures shall require a renovation permit. In addition, plans to protect the occupants during demolition and renovation needs to be submitted including the continued accessibility for occupying portion of building. Internal demolition will be subject to E-1, 2, 3.
- (d) The following conditions shall apply for any removal within 100 feet of another structure of a separate building user or owner:
  - 1. Photograph or video tape all internal wall surfaces 7 days before demolition commences of adjacent building's structure so as to record pre-demolition condition. These records shall be given to the Building Inspection Department before demolition commences and kept for one full year after completion of demolition.
  - 2. A structural engineer's report is required that will detail the protection and renovation required of the adjacent shared wall. Those recommendations will be added to the conditions of demolition permit and renovation permits.
  - 3. Additional Permits required:
    - a. Renovation permit; Chapter 30.
    - b. Erosion control; Chapter 29.
    - c. Structure; Chapter 30.
    - d. HVAC; Chapter 30.
    - e. Plumbing; Chapter 30.
    - f. Electrical; Chapter 30.
    - g. Occupancy; Chapter 30.
- (e) Footings and basement walls shall not be removed if they are within 10 feet of another structure. Or portion thereof that is not to be removed.
  - 1. Reuse of a footing and wall for another structure can be reused if inspected and approved by city building inspector.
- (f) Approval of haul routes, by the appropriate jurisdictions will be required for Type C, C1, D, D1 structures. Only on designated truck routes and one route from site to a truck route approved by Supt. of Public Works. The cargo of the hauling vehicle will be required be enclosed if cargo material is under 12" in dimension.
- (g) The use of explosives, may be permitted by the Public Works Committee only if:

1. The structure is more than 100 ft from any property line or another structure or height of building whichever is greatest.
  2. Fire department written approval and conditions are received and so Comm. 7 to be adhered to. Dust and flying debris control will be mandatory.
- (h) Razing by burning will be permitted only with the concurrence of the Fire Chief.
- (i) All litter beyond access control fence, shall be removed before sunset of the day it is deposited.

(7) RESTORATION

- (a) Temporary restoration is permitted if the site is to be built upon within 6 months. Temporary restoration will not require grading, leveling and landscaping of the site.
1. Use of dust proofing, waterproofing methods for temporary restoration to be approved by Building Inspection.
- (b) Permanent restoration will be required for Type B, B1, C, C1, D, D1 if the site is not to be built upon within 6 months of completion of demolition and Chapter 29 of City Ordinances shall apply.
- (c) Non-structural back fill is permitted for Type B, B1, C, C1, D, D1 and may be demolition masonry or concrete debris provided that no dimension of the material exceeds 12 inches and is not wood, plastics or steel or painted concrete. Non-structural backfill can only be used in areas not scheduled for future structures.
- (d) Structural back filling shall meet WDOT Sections 206, 207, 208 and 209.
1. Compression of clays or granular soils with less than 10% silts or organic material maybe 90%. However, a one calendar year wait will be required before a new structure can be built. In addition, the fill shall be mounded 6" to 12" higher than adjacent ground.
  2. Native soils shall otherwise be compressed to 95% density for future new structure.
- (e) Grading to match surrounding slopes and grades:
1. Landscaping shall be at least 6" topsoil, seeding and mulching placed in accordance with WDOT Sections 625, 627, 629, and 630.
- (f) Permanent Erosion Control conditions of Chapter 29 of City Ordinances will be required during and after demolition.
- (g) Chapter 34 of City ordinances shall apply for all C, C1, D, and D1 demolition sites.
- (h) Access control for **Type A, A1, B, B1, C, C1, D, D1** structures during demolition will consist of complete enclosure at least to a 4' height and for active sidewalk use overhead shielding for necessary pedestrian and vehicle movements for **Type C, C1, D, D1**.
- (i) Chapter 29 of City ordinances shall apply for erosion control during Demolition.

- (j) After Demolition all barricades, silt fences, shields, equipment, etc., shall be removed from the site.
- (8) REUSE CERTIFICATE
- (a) The sites of previous Type B, B1, C, C1, D, D1 structures can be used for other facilities after a reuse certificate is issued by Building Inspector asserting that all conditions of this ordinance is met.
  - (b) Site restoration may be modified or reduced if a building permit is taken out for a new structure and site development if the permit(s) are taken out before expiration of the demolition permit. In such cases, restoration will be governed by the conditions of the building and site development permit(s).

**30.10 INSPECTIONS (Ord. #1045 – 10-19-00)**

(1) REQUIRED AND PERMITTED INSPECTIONS

Following the issuance of any permit under this Code, specific inspections are required. A list of required inspections for particular projects can be obtained from the Building Inspection Department upon request. Further, the Building Inspector may, with or without notice or invitation, from time to time and at any time, inspect the work that is the subject of the permit, to ascertain if the work is being done or executed in compliance with this Code and all other applicable legal requirements.

(2) PERMIT HOLDER DUTIES

The permit holder or authorized agent shall notify the Building Inspection Department at such times as an inspection is required under this Code. The property owner, permit holder or their authorized agent shall provide all ladders, scaffolds and other equipment required to access the area to be inspected. If, upon any inspection, it is found that a required inspection cannot be made because work to be inspected has been covered or concealed, the property owner, permit holder or authorized agent shall uncover the work, as directed by the Building Inspector, and no approval of covered or concealed work shall be given until the required inspection can be made and the work complies with the provisions of this Code and other applicable state and local regulations.

(3) INSPECTION REQUESTS

The Building Inspector shall respond to inspection requests without unreasonable delay. Upon inspection, the Building Inspector shall notify the property owner, permit holder or authorized agent of any defects found, approve the work or waive the inspection. (Action to waive the inspection shall be in writing by the Building Inspector).

(4) RESULTS NOTIFICATION

The Building Inspector shall notify the property owner, permit holder or authorized agent of the results of the inspection on the official permit sticker that shall be posted on the premises. Surfaces unsuitable for sticker placement such as footings, foundations or other similar surfaces may require the use of lumber crayons, permanent markers or other means to record results. In cases where there is no surface suitable for the placement of stickers and where the use of lumber crayons or permanent markers would be detrimental to the surface, the results shall be forwarded either verbally or in writing to the property owner,

permit holder or authorized agent. In all cases, a copy of the inspection results shall be placed in the permanent records of the Building Department.

(5) EXISTING STRUCTURES

The Building Inspector shall have authority to make inspections from time to time, or as otherwise required by THIS CODE, of all existing non-commercial structures to ascertain whether the use, maintenance and occupancy is in accordance with all applicable requirements. The Fire Inspector has primary responsibility for inspection of existing commercial applications.

(6) RE-INSPECTION

When violations of this Code are found to exist, the property owner, permit holder or authorized agent shall cause required corrections to be made and shall contact the Building Inspection Department to arrange for re-inspection of the work. Each required inspection is allotted one (1) re-inspection; subsequent re-inspections shall result in the assessment of a re-inspection fee as from time to time established by resolution of the Common Council and listed in TABLE #1. Said re-inspection fee shall be paid prior to any further re-inspections of the work.

(7) FINAL INSPECTION

Upon completion of any building, structure, equipment or other work for which a permit has been issued and before same is occupied or used, a final inspection shall be made by the Building Inspector, and until such building, structure, equipment or other work for which a permit has been issued is in compliance with all applicable requirements of this Code and terms of the permit, a certificate of occupancy shall not be issued and no occupancy shall be maintained.

- (a) If a registered architect or engineer has supervised the construction or other work with respect to which a permit was issued, no certificate of occupancy shall be issued, until such time as the architect or engineer of record has provided a certificate of compliance or completion statement to the Building Inspector. The certificate or statement shall certify that the work supervised or designed by the architect or engineer has been completed in accordance with all the terms and conditions of the permit, the approved plans and all provisions of this Code.

(8) FAILURE TO REQUEST INSPECTION

Failure to request required inspections in a timely manner, or allowing work to be covered prior to inspection, may result in the assessment of a penalty fee against the permit holder, or owner of record; said penalty fee to be as from time to time established by resolution of the Common Council and listed in Table #1.

(9) SPECIAL INSPECTION WARRANT

In addition to the inspection powers of the Department under this Section, the Building Inspector or his duly authorized agent(s) and the Fire Inspector(s) of the City are authorized to obtain special inspection warrants as provided in Sections 66.0119 , Wis. Stats., to ascertain compliance under this Chapter, other subject Chapters and other applicable legal requirements.

(10) BOARD OF APPEALS

Any person feeling aggrieved by any order or ruling of the Building Inspector may appeal such ruling to the Board of Appeals within twenty (20) days after written notice of such ruling shall have been delivered to him. Such appeal is to be in writing, setting forth the order appealed from and the respects in which said person feeling aggrieved claims that said order or ruling is erroneous or illegal. Said notice of appeal shall be filed with the Planning Director or his duly authorized representative, who shall thereupon notify the Building Inspector of said appeal, and the appeal shall be heard at the next meeting of the Board of Appeals. The said Board of Appeals, after consideration thereof, shall affirm, reverse or modify said order or ruling. The ruling or order of the Inspector shall be enforced until changed by said Board of Appeals.

**30.11 STOP WORK ORDER (Ord. #1045 – 10-19-00)**

Whenever the provisions of this Code or of the plans approved hereunder are not complied with, a stop work order shall be served on the owner or his representative and a copy thereof shall be posted at the site of the construction. Such stop work order shall not be removed except by written notice of the Building Inspector after satisfactory evidence has been supplied that the violation has been corrected. In the event that work continues, or stops and then again resumes after the stop work order has been posted and before the Building Inspector has provided written notice that work may resume, each day that work continues shall constitute a separate offense and the Building Inspector shall not be required to continually re-post the site.

**30.12 CERTIFICATE OF OCCUPANCY**

(1) INSPECTIONS (Ord. #1248 – 02-01-2007)

- (a) The Building Inspector shall make a final inspection of all new buildings, additions and alterations. If no violations of this or any other ordinance can be found the Building Inspector shall issue a certificate of occupancy, stating the purpose for which the building is to be used [see also 30.10(7)(a) and 30.07(5)(a)], except that no occupancy certificate may be issued for any building in the City until the plumbing inspector has verified compliance with the provisions of §16.11 of the City of Muskego Code. (Rep. & Recr. #1334 11-04-2010)
- (b) No building, nor part thereof, shall be utilized or otherwise put into service, until such final inspection has been approved and certificate of occupancy has been issued, nor shall any building be utilized in any manner which conflicts with the conditions set forth in the certificate of occupancy.
- (c) The Planning Director or designee shall make a final inspection of all new buildings, building sites, additions and alterations of multi-family, commercial and industrial properties in order to assure all approvals from Planning Commission or other Boards have been accomplished. If all approvals have been followed, a certificate of occupancy will be allowed. If further improvements are required, the certificate of occupancy will be withheld until such time the improvements are completed. A certificate of occupancy may be issued subject to certain items being completed within a given amount of time, however, if the items are not completed within the given timeframe, the certificate of occupancy can be revoked as per Section

30.07(5)a of this ordinance. Revocation of the certificate of occupancy requires all business use of the property to cease immediately until such time a new certificate of occupancy is given.

(2) USE DISCONTINUED

- (a) Whenever any building or portion thereof is being used or occupied contrary to the provisions of this Code, the Building Inspector shall order such use or occupancy discontinued and the building, or portion thereof, vacated by notice served on any person using or causing such use or occupancy to be continued and such person shall vacate such building or portion thereof within ten (10) days after receipt of the notice or make the building, or portion thereof, comply with the requirements of this Code.
- (b) Any building, structure or premises, or any part thereof, hereafter vacated or damaged by any cause whatsoever so as to jeopardize public safety or health, shall not hereafter be occupied or used under an existing certificate of occupancy or without the same, until an application has been filed and a new certificate of occupancy issued.

(3) CHANGE

It shall be unlawful to change the use of any building, structure, premises or part thereof, without first obtaining, from the Building Inspector and Planning Director, an approval of such change in the occupancy or use and a certificate of occupancy therefore. See also Muskego Municipal Code, Chapter 33.00, Business Occupancy Registration Ordinance.

(4) HARDSHIP

The Building Inspector shall have the authority and power to permit the occupancy of any building or structure in the municipality, prior to issuance of any occupancy certificate, in all such cases of hardship, as in his judgment and discretion, warrant occupancy before final stage of completion as set forth in this Code. Before granting such permission, the Building Inspector shall first examine the premises and determine if it is safe and sanitary. The Building Inspector shall determine the time within which such building or structure can be completed. Such time should not exceed one hundred twenty (120) days.

**CHAPTER IV. - DESIGN**

**30.13 GENERAL REQUIREMENTS**

DESIGN REQUIREMENTS - Wind load, snow load, live load, dead load, soil bearing classifications, slopes, clearances and any other applicable load and/or design requirements shall be as required by COMM 20 - 25 or COMM 61-65 and the Wisconsin Enrolled Commercial Building Code Volumes 1 and 2.

**CHAPTER V. - ACCESSORY BUILDINGS AND GARAGES**

**30.14 ACCESSORY BUILDINGS**

(1) ACCESSORY BUILDINGS

Accessory Building, shall mean a detached, non-commercial, or non-dwelling, or non-garage structure.

(a) STORAGE SHED

A structure conforming to the height and area limitations of Muskego Municipal Zoning Ordinance, Chapter 17, Section 5.05. (Ord. #1248 – 02/01/2007)

- (1) Foundation to be minimum of 4" stone placed under pressure treated lumber, asphalt flooring, sealed concrete block or concrete with anchor bolts at each corner and every 6 feet o/c to secure treated bottom plate to foundation or 2 - 16D common nails in each corner and every 16 inches o/c (nails shall not be used for anchorage to masonry foundations).
- (2) Roof and Wall framing to be minimum 2x4 #2 or better in accordance with construction requirements of 30.15(5.).

(b) POLE BUILDING

A structure using post and beam construction in place of conventional 2x4 or 2x6 framing. All such buildings shall comply with the following design criteria regardless of the buildings intended use.

- (1) Wisconsin registered architect or engineer shall stamp and sign all plans for pole buildings (regardless of size) verifying the structure has been designed to support DEAD LOADS, SNOW LOADS, WIND LOADS and that the design meets or exceeds the design requirements of IBC Chapter 16 for pole type foundations.
- (2) Floor surfaces to be concrete in accordance with 30.15(4.) **Exception** - concrete floors shall not be required in stable areas and/or riding areas of detached accessory structures used for housing equine (pole foundation must be designed accordingly to meet restraint requirements).

**30.15 GARAGES**

(1) GARAGE DEFINED

Garage shall mean either attached or detached private non-commercial garage.

- (a) An attached private garage shall mean a private garage attached directly to the principal building, or attached by means of an enclosed or open breezeway, porch, terrace or vestibule, or a private garage so constructed as to form an integral part of the principal building.
- (b) A detached private garage shall mean a private garage entirely separated from the principal building.

(2) LOCATIONS

Detached garages shall be governed by the following unless otherwise provided for in appropriate codes.

- (a) Garages of wood frame construction shall be located not less than ten (10) feet from any residence building, except that such distance may be reduced to not less than five (5) feet when the adjacent wall is protected as required for attached garages in COMM 21.08(5). Such separations shall be measured as the perpendicular distance from the exterior dwelling wall to the closest exterior garage or accessory building wall.

(3) FOUNDATIONS AND FOOTINGS

Foundations for attached and detached private garages shall be constructed in accordance with (a) and (b) below.

- (a) Attached private garages shall be provided with the same type footings and foundations as required herein for the principal building. Concrete floors shall be not less than four (4) inches in thickness.
- (b) Detached private garages may be built with a continuous floating slab of reinforced concrete not less than four (4) inches in thickness. Reinforcement shall be a minimum of number 10 six by six (6 X 6) inch wire mesh. The slab shall be provided with a thickened edge all around, twelve (12) inches wide and twelve (12) inches below the top of the slab. Exterior wall curbs shall be provided not less than four (4) inches above the finished ground grade adjacent to the garage. Bolts three-eighths (3/8) inches in diameter with nuts and washers attached, six (6) inches long, shall be embedded three (3) inches in the raised concrete curb of detached garages, no more than 18 inches from corners and shall have a maximum spacing of eight (8) feet on centers.

(4) FLOOR SURFACE

The floor in all private garages shall be of concrete construction and sloped toward the exterior garage door or opening at a rate of 1/8 inch drop per foot of run. No openings or pits in the floor shall be permitted, except for drainage. Note: Floor drains placed within garages shall be designed to meet all applicable plumbing codes and shall discharge to daylight, see plumbing inspector for additional details.

(5) CONSTRUCTION

Private garages shall be constructed as follows:

- (a) Load bearing foundation walls and partitions shall be constructed per 30.18(3) above.
- (b) Private garages of wood frame construction shall be constructed with the following requirements.
  - 1. Studs for wall framing shall be a minimum of 2 x 4, with a maximum spacing of twenty-four (24) inches on centers. Bottom plate(s) in contact with masonry

or concrete shall be of treated material. Top plate(s) shall be doubled with end joints staggered a minimum of 48 inches.

2. Diagonal corner bracing shall be installed on both walls at each corner. Diagonal corner bracing may be applied on the inside surface of studs (plywood, let-in 1 X 4's or metal T-strips designed for this purpose are acceptable as corner bracing).
3. Corner posts may consist of two (2) two by four (2 X 4) inch studs or a single four by four (4 X 4) inch stud.
4. Collar beams or joists at the top plate and collar ties in the upper one third of the roof shall be installed with a maximum spacing of forty-eight (48) inches on center. Collar beams may be two by six (2 X 6) inch. Collar ties shall be at least two by four (2 X 4) inch for roof slopes less than four (4) inches per foot. A one by six (1 X 6) inch collar tie may be used for roof slopes four (4) inches per foot or greater.
5. Garage roofs shall be framed in accordance with the applicable requirements of section COMM 21.28.

## **CHAPTER VI. - DECKS**

### **30.16 DECKS**

#### **(1) DECK**

Deck shall mean any structure, which serves as a raised horizontal platform, or floor constructed of wood or other materials, without enclosing walls, either attached or detached.

- (a) Attached Deck: Any deck, which is physically connected to the principal building or accessory structure.
- (b) Detached Deck: Any deck which is not physically attached to the principal building or accessory structure.

#### **(2) FOUNDATIONS**

Deck foundations shall be of adequate bearing area to safely distribute all live and dead loads to the supporting soil without exceeding the bearing capacity of the soil.

- (a) Detached deck foundations - supporting pad size, post size and post spacing to provide adequate bearing for applicable loads in conjunction with soil bearing conditions.
- (b) Attached deck foundations - shall be designed in accordance with COMM 21.225(1), (2), (3), (4), & (6).

#### **(3) FRAMING - Deck framing shall be in accordance with COMM 21.19, 21.22, 21.225(5) & (6).**

## **CHAPTER VII. - FOUNDATION REPAIR**

**30.17 FOUNDATION REPAIRS AND DAMP-PROOFING**

- (1) All Foundation repairs shall be completed as defined in BEST MANAGEMENT STANDARDS FOR FOUNDATION REPAIR MARCH 2003 PUBLICATION, as amended from time to time, herein attached as Exhibit "A."

**CHAPTER VIII. - MISCELLANEOUS AND VIOLATIONS**

**30.18 NEW MATERIALS AND METHODS**

ALTERNATE MATERIALS - No provision in this Code is intended to prohibit or prevent the use of any alternate material or method of construction not specifically mentioned in this Code. Requests for approval shall be accompanied by evidence showing that the alternate material or method of construction performs in a manner equal to the material or method required by this Code.

**30.19 TESTS**

The Building Inspector may request engineering calculations or other tests to substantiate the alternate proposal is equivalent to or superior to that which is required by this Code. The cost of such verification shall be borne by the person requesting the approval.

- (1) The test method used to determine the performance shall be one that is a nationally recognized standard.
- (2) If no nationally recognized standard exists, past performance or recognized engineering analysis may be used to determine suitability.
- (3) Ungraded or used building materials may be used or reused as long as the material possesses the essential properties necessary to achieve the level of performance required by this Code for the intended use. The municipality enforcing this Code may require tests in accordance with this Section.

**30.20 IDENTIFICATION OF PRODUCTS**

All materials shall be identified by the approved label, the grade mark, the trade mark or by other approved manufacturer's identification

**30.21 VALIDITY OF PAST**

If any section, subsection, paragraph, clause or provision of this Code shall be adjudged invalid, such adjudication shall apply only to the provisions so adjudged and the rest of this Code shall remain valid and effective.

**30.22 VIOLATIONS**

It shall be unlawful for any person to erect, use, occupy or maintain any building or structure in violation of any provisions of this Code, or to cause, permit or suffer any such violations to be committed. Any person violating any of the provisions of this Code shall, upon conviction, be subject to a forfeiture of not less than fifty dollars (\$50) or more than five hundred dollars (\$500),

together with the costs of prosecution and, in default of payment thereof, shall be imprisoned for a period of not less than one (1) day or more than six (6) months or until such forfeiture and costs are paid. It shall be the responsibility of the offender to abate the violation as expeditiously as possible and each day that such violation is permitted to continue shall constitute a separate offense. If, in any action, a permit was issued, it shall not constitute a defense nor shall any error, oversight or dereliction of duty on the part of the Building Inspector constitute a defense.

### **30.23 FAILURE TO OBTAIN PERMIT**

It shall be unlawful to commence work prior to obtaining a permit. Penalty fees as from time to time established by resolution of the Common Council and listed in TABLE #1 shall be charged if work is commenced prior to the issuance of a permit.

### **30.24 EMERGENCY RESPONSE AMPLIFICATION**

#### **1. GENERAL**

Except as otherwise provided, no person or organization shall maintain, own, erect or construct any building or structure or any part thereof or cause the same to be done which fails to support adequate radio coverage to public safety service workers, including but not limited to firefighters and police officers. For purposes of this section, adequate radio coverage shall include all of the following:

A. A minimum signal strength of two (2) microvolts ( - 101 dBm) available in 95% of the area of each floor of the building when transmitted from the Public Safety Radio Communications System; and

B. A minimum signal strength of one (2) microvolts ( -101 dBm) received at the Public Safety Radio Communications System when transmitted from 95% of the area of each floor of the building.

C. The frequency range, which must be supported, shall be 866.000 to 869.000 MHz from the Trunked System Communications base stations, and 821 to 824 MHz to the Public Safety Radio Communications base stations.

#### **2. TESTING PROCEDURES.**

A. Initial Tests. Initial tests will be performed by public safety employees or their designees. A Certificate of Occupancy shall not be issued to any structure if the building fails to comply with this section.

B. Annual Tests. Annual tests will be conducted by the Fire Department in conjunction with inspection procedures.

#### **3. AMPLIFICATION SYSTEMS ALLOWED.**

Buildings and structures which cannot independently support the required level of radio coverage shall be equipped with any of the following in order to achieve the required adequate radio coverage: a radiating cable system or an internal multiple antenna system with or without FCC type-accepted signal booster amplifiers as needed. If any part of the installed system or

systems contains an electrically powered component, the system shall be capable of operating on an independent battery and/or generator system for a period of at least twelve (12) hours without external power input. Any battery system employed shall automatically recharge in the presence of an external power input. In the event that a signal booster is employed it shall be fully encased within a dust and water resistant case.

4. FIELD TESTING.

Police and Fire Personnel, after providing reasonable notice to the owner or his representative, shall have the right to enter onto the property to conduct field testing to be certain the required level of radio coverage is present.

5. EXEMPTIONS.

This sections shall not apply to: buildings permitted in residentially zoned areas. For purposes of this section, basements, parking structures and stairwells are included in the definition of "all parts of a building" but elevators may be excluded.

March - 2003

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These Standards were prepared by a licensed State of Wisconsin registered structural engineer, Jendusa Engineering Associates, Inc. specifically for the Wisconsin Association of Foundation Repair Professionals (WAFRP) in cooperation with the Building Inspectors Association of Southeastern Wisconsin to address various conditions and foundation repair standards.



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## GLOSSARY OF TERMS

**Backfill** – Material used to fill in an excavation.

**Bleeders** – Concrete or plastic pipe that is installed through the footing or foundation wall to allow transfer of water from the exterior drain tile to the interior drain tile.

**Concrete Block** – Concrete masonry unit used in basement wall construction. Concrete block is commonly used in nominal 8", 10" or 12" widths and is typically 8" tall by 16" long with 2 open cells in the block. The concrete blocks are stacked with alternating vertical joints using mortar between the joints to hold the block together.

**Downspout** – Aluminum or galvanized steel pipe that directs water collected in the rain gutters down to the ground and away from the building

**Drain Tile (Interior or Exterior)** – Concrete or plastic perforated pipe used underground to collect water and direct it to the sump crock. Exterior drain tile is placed on the outside of

the building at the elevation of, or on top of the footing, consistent with existing conditions. Interior drain tile is placed around the inside perimeter of the building just below the floor slab. Drain tile is encased in clear aggregate to allow for water drainage to the pipe.

**Drain Tile Test** – A test of the function of the interior drain tile. The drain tile test is performed by: cutting through the floor slab to access the drain tile, flushing water into the drain tile and observing the amount of water entering the sump crock. A diminished water flow indicates a plugged or crushed drain tile.

**Efflorescence (Scale Stains)** – White mineral deposits showing on face of masonry due to water leaching through the masonry to the dry surface.

**Epoxy** - Material used to repair cracks in concrete or masonry. Epoxy is a material that can be injected into wall cracks and when cured forms a very strong bond with the base material. Epoxy can be used for the structural repair of walls.

**Grade** – Reference to the pitch of the exterior ground surface adjacent to the building.

**Horizontal Cracks** – Usually associated with bowing or displacement of masonry walls that are not plumb vertically and/or horizontally.

**Laser Level** – Instrument, which emits a beam of light on a certain horizontal or vertical plane. This plane can be used to measure deflection and/or movement of an adjacent plane.

**Level** – Instrument used for measuring the plane of a vertical or horizontal surface.

**Palmer Valve** – Stormwater discharge valve typically located in the sidewall of the floor drain, designed to prevent backflow of sanitary sewer into stormwater system.

**Pilaster** – A projection of masonry or a filled cell area of masonry for the purpose of bearing concentrated loads or to stiffen the wall against lateral forces.

**Plumb Line** – Tool for measuring wall deflection consisting of a weight and string. The string is attached at the top of the wall and the weight is at the end of the string located near the floor providing a straight vertical reference line. Measurements are taken from the string to the wall to determine the amount of horizontal deflection in the wall.

**Polyurethane** – Material that can be injected into wall cracks to prevent water leakage. Polyurethane should not be used for the structural repair of walls.

**Poured Walls** – Solid concrete walls that are constructed by setting concrete wall forms, installing steel reinforcing bars and pouring concrete into the forms to create a wall.

**Radon Gas** – Odorless and colorless slightly radioactive gas that can seep into basements through floor or wall cracks. At certain concentrations Radon Gas is considered a health hazard.

**Seepage** – Water infiltration through masonry walls or floor slab. Seepage is evidenced by damp or wet masonry walls or concrete floor and is an indication that the basement drainage system is overloaded or not functioning correctly.

**Spud Pipe** – Steel pipe, 3/4" to 1" diameter that is driven into the soil around the perimeter of the building. Water is injected into the soil thru the pipe just above the elevation of the drain tile to test the function of the drain tile.

**Steel Restraints** – Wall reinforcing used to prevent further movement in basement walls. Steel restraints are typically composed of steel tubes placed vertically against the basement walls at a 32" or 48" spacing.

**Step Cracks** – Cracks in masonry walls that follow the vertical and horizontal joints in the masonry in a stepped fashion. Step cracks can be due to horizontal wall deflection, foundation settlement or shrinkage of concrete masonry.

**Stone Backfill** – Clear crushed aggregate 3/4" to 1" diameter used to backfill excavations. Stone backfill allows for water to migrate easily towards the drain tile located at the basement footing elevation. Additionally, stone backfill will have minimal settlement around the perimeter of the building after backfilling.

**Sump Crock** – Concrete, steel or plastic basin placed below the floor slab in the lowest area of the building for collecting water from drain tile. Top rim to extend minimum 1" above floor.

**Sump Pump** – Submersible or upright pump located in sump crock to pump water out and away from the building.

**Tuckpoint** – Term used for the repair of cracks that occur in the joints in masonry walls. Tuckpointing involves the removal and replacement of the mortar between masonry units where cracking along the joints has occurred.

**Wall Drainage Board** – One piece corrugated or ribbed plastic panel that is placed to form an angle on top of the wall footing and against the masonry wall. The panel extends a minimum of 1" above the floor slab elevation. The wall drainage board is used to drain

water from the cores of concrete masonry walls to the interior drain tile. (See Appendix C for product listing)

**Wall Deflection** – The amount of horizontal movement in a basement wall at any given location with respect to its vertical plane.

**Wall Irregularities** – Masonry wall corners or areas in the wall that have thickened sections. Examples of wall irregularities include foundations for masonry fireplaces and wall pilasters.

**Wall Slide** – Horizontal movement of basement wall, usually occurring at the bottom section of the wall.

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## 1. **CONDITION: Wet walls / No leakage on floor (NO DISPLACEMENT)**

### Characteristics:

Water spots on walls, wet walls, walls periodically dry up usually leaving scale stains, efflorescence, or mildew. Damp spots either high or low on wall. No major cracks or bowing. No significant block deterioration or displacement. No leaning of walls. No movement in footing.

### Testing:

1. Check palmer valve or sump pump for correct operation. Check with local jurisdiction if palmer valve is permitted (per local requirements).
2. Break open floor, test interior drain tile for correct flow to palmer valve, or sump pump.
3. Use water spud pipe, inserted along outside wall to exterior drain tile, to introduce water to check exterior drain tile operation.
4. Check for proper grade away from exterior walls and adequate gutters & downspouts.

### Standard Repairs:

1. Extend downspouts, improve grade by increasing pitch away from buildings to the greatest extent possible.
2. Install, replace, or repair sump pump. Sump pump must meet State and local Plumbing and Electrical Code.
3. Replace some or all of interior drain tile as necessary, drain first block into interior drain tile using an approved one-piece wall drainage board that provides water passage and lateral support to first course of block. Wall drainage board to be 1" minimum higher than floor. Use a wall drainage board that can be caulked for retarding radon migration. Install to manufactures specifications. See Appendix B & C.

4. In some cases it may be necessary to excavate to footing, seal wall, clean out bleeders, replace exterior drain tile, backfill to within 12-18" of grade with clear stone backfill. See Appendix A.

### Maintenance After Repair:

1. Keep downspouts extended.
2. Maintain positive pitch of grade away from house.

### NO SITE SPECIFIC ENGINEERING REQUIRED

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## 2. CONDITION: Water leakage at wall/floor joint

### Characteristics:

**Signs of water leakage to a maximum of TWO courses high.** Water puddles or streams during or after heavy rains. Walls often have wet or damp areas, presence of mildew or efflorescence. Walls show no cracking, bowing or displacement.

### Testing:

1. Check palmer valve or sump pump for correct operation. Check with local jurisdiction if palmer valve is permitted (per local requirements).
2. Break open floor, test interior drain tile for correct flow.
3. Use water spud pipe, inserted along outside wall to exterior drain tile, to introduce water to check exterior drain tile operation.
4. Check for proper grade away from exterior walls and adequate gutters & downspouts.

### Standard Repairs:

1. Extend downspouts, improve grade by increasing pitch away from buildings to the greatest extent possible.
2. Install, replace, or repair sump pump. Sump pump must meet State and local Plumbing and Electrical Code.
3. Replace some or all of interior drain tile as necessary, drain first block into interior drain tile using an approved one-piece wall drainage board that provides water passage and lateral support to first course of block. Wall drainage board to be 1" minimum higher than floor. Use a wall drainage board that can be caulked for retarding radon migration. Install to manufactures specifications. See Appendix B & C.
4. In some cases, it may be necessary to excavate to footing, seal wall, clean out bleeders, replace exterior drain tile, backfill to within 12-18" of grade with clear stone backfill. See Appendix A.

### Maintenance After Repair:

1. Keep downspouts extended.
2. Maintain positive pitch of grade away from house.

### **NO SITE SPECIFIC ENGINEERING REQUIRED**

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### **3. CONDITION: Water leakage above wall base**

#### **Characteristics:**

Signs of water leakage appear in the middle to upper wall section. Water puddles or streams during or after heavy rains. Walls often have wet or damp areas, presence of mildew or efflorescence. Walls show no cracking, bowing or displacement.

#### **Testing:**

1. Check palmer valve or sump pump for correct operation. Check with local jurisdiction if palmer valve is permitted (per local requirements).
2. Break open floor, test interior drain tile for correct flow.
3. Use water spud pipe, inserted along outside wall to exterior drain tile, to introduce water to check exterior drain tile operation.
4. Check for proper grade away from exterior walls and adequate gutters & downspouts.

#### **Standard Repairs:**

1. Extend downspouts, improve grade by increasing pitch away from buildings to the greatest extent possible.
2. Install, replace or repair sump pump. Sump pump must meet State and local Plumbing and Electrical Code.
3. Replace some or all of interior drain tile as necessary, drain first block into interior drain tile using an approved one-piece wall drainage board that provides water passage and lateral support to first course of block. Wall drainage board to be 1" minimum higher than floor. Use a wall drainage board that can be caulked for retarding radon migration. Install to manufactures specifications. See Appendix B & C.
4. Excavate, seal wall, clean out bleeders and test interior drain tile for correct flow, replace exterior drain tile, backfill to within 12-18" of grade with clear stone backfill. See Appendix A.

#### **Maintenance After Repair:**

1. Keep downspouts extended.
2. Maintain positive pitch of grade away from house.

### **NO SITE SPECIFIC ENGINEERING REQUIRED**

---

#### 4. CONDITION: Water seepage through floor slab

##### Characteristics:

Water seepage occurs through cracks in the floor slab, away from the basement walls, causing discoloration and dampness.

##### Testing:

1. Break open floor at site of leakage.
2. Check for defective sump pump or stuck palmer valve (if present). Check with local jurisdiction if palmer valve is permitted (per local requirements).
3. Check for interior drain tile presence and perform interior drain tile test.
4. Check sewer system for proper drainage.

##### Standard Repairs:

1. Remove floor along leak areas.  
**IF NO DRAIN TILE:** Dig out substrate. Install drain tile and approved drainage system, embed in filtering stone, install sump crock and pump (if required), replace floor removed. See Appendix B.  
**IF DRAIN TILE FOUND:** Replace as needed, interior drain tile to provide correct drainage to sump or palmer valve. See appendix B.  
**IF LEAK NOT ALONG WALL:** Install additional interior drain tile lateral for drainage and connect to interior wall perimeter drain tile.
2. Install, replace, or repair sump pump. Sump pump must meet State and local Plumbing and Electrical Code.
3. Replace some or all of interior drain tile as necessary, drain first block into interior drain tile using an approved one-piece wall drainage board that provides water passage and lateral support to first course of block. Wall drainage board to be 1" minimum higher than floor. Use a wall drainage board that can be caulked for retarding radon migration. Install to manufacturers specifications. See Appendix B & C.

##### Maintenance After Repair:

1. Keep downspouts extended.
2. Maintain positive pitch of grade away from house.

#### **NO SITE SPECIFIC ENGINEERING REQUIRED**

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#### 5. CONDITION: Leaning or bowed walls / Wall deflection less than one inch (NO MOVEMENT)

### Characteristics:

One or more walls are bowed or leaning, with no signs of current or recent movement. The total amount of wall deflection is less than one inch from the original wall construction. Water seepage may be present at the floor line. Cracks have been patched or tuckpointed in the distant past, with no sign of recent painting or patching. Owner indicates no observation of change in crack appearance or width. There may be evidence of prior wall repair/reinforcing or the walls could have been constructed out of plumb.

### Testing:

Six foot level or plumb line and tape measure to check wall alignment.

Transit or laser level to check wall alignment.

### Standard Repairs:

1. Do nothing; advise owner to monitor for further movement.
2. Reinforce with recommended engineered steel support restraints every 32 to 48" on center, along bowed wall without excavating, grout behind supports. See Wall Reinforcement Design and Details. See Appendix A.
3. Excavate; straighten as best as possible. Reinforce with recommended engineered steel beam restraints. Reseal wall. Clean out bleeders and test interior drain tile for correct flow, replace exterior drain tile, backfill to within 12-18" of grade with clear stone backfill. See appendix A.
4. Replace any defective interior drain tile to provide adequate drainage to sump or sewer system. See Appendix B.

### Maintenance After Repair:

1. Keep downspouts extended.
2. Maintain positive pitch of grade away from house.

### **NO SITE SPECIFIC ENGINEERING REQUIRED**

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## **6. CONDITION: Wall step cracks with no displacement**

### Characteristics:

Appearance of cracks that follow the block joints in a diagonal fashion (step cracks). Many step cracks occur at the edge of windows or wall openings. There is no evidence of wall displacement, bowing or water leakage. Step cracks can be associated with minor foundation settlement or shrinkage of the concrete masonry wall. Under this condition there are no continuous horizontal wall cracks, water leakage or displacement.

Testing:

Six foot level or plumb line and tape measure to check wall alignment.

Transit or laser level to check wall alignment.

Standard Repairs:

1. Tuckpoint the visible cracks and recommend to owner to monitor for further movement.
2. If the crack exceeds 1/4" width, consult engineer for site-specific engineering.

Maintenance After Repair:

1. Keep downspouts extended.
2. Maintain positive pitch of grade away from house.

**NO SITE SPECIFIC ENGINEERING REQUIRED**

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**7. CONDITION: Leaning or bowed walls / Wall deflection less than one inch  
(SOME MOVEMENT)**

Characteristics:

One or more walls are bowed or leaning, with signs of current or recent movement. Wall cracks are less than 1/4" wide. The total amount of wall deflection is less than one inch from the original wall construction. Water seepage may be present at the floor line. Previously repaired wall cracks show signs of continued cracking. Horizontal wall cracks are usually associated with bowing and may open and close with the seasons. Vertical or step wall cracks are usually associated with leaning walls or wall bowing adjacent to wall irregularities. There is no indication of settlement of the wall footings.

Testing:

Six foot level or plumb line and tape measure to check wall alignment.

Transit or laser level to check wall alignment.

Standard Repairs:

1. Reinforce with engineered steel support restraints every 32 to 48" on center along bowed wall without excavating, grout behind supports. See Wall Reinforcement and Design. See Appendix A.
2. Excavate; straighten as best as possible. Reinforce with recommended engineered steel restraints. Reseal wall. Clean out bleeders and test interior drain tile for correct flow, replace exterior drain tile, backfill to within 12-18" of grade with clear stone backfill. See Appendix A.
3. If bowing in conjunction with wet walls or seepage, include previous repairs and testing. See Appendix B & C.

Maintenance After Repair:

1. Keep downspouts extended.
2. Maintain positive pitch of grade away from house.

**NO SITE SPECIFIC ENGINEERING REQUIRED**

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**8. CONDITION: Leaning or bowed walls / Wall deflection one inch or more  
(SIGNIFICANT MOVEMENT)**

Characteristics:

One or more walls are bowed or leaning, with signs of current or recent movement. Wall cracks may be greater than 1/4" wide. The total amount of wall deflection is one inch or more from the original wall construction. Water seepage may be present at the floor line. Previously repaired wall cracks show signs of continued cracking. Horizontal wall cracks are usually associated with bowing and may open and close with the seasons. Vertical or step wall cracks are usually associated with leaning walls or wall bowing adjacent to wall irregularities. There is no indication of settlement of the wall footings.

Testing:

Six foot level or plumb line and tape measure to check wall alignment.

Transit or laser level to check wall alignment.

Standard Repairs:

1. Excavate; straighten as best as possible. Reinforce with recommended engineered steel restraints. Reseal wall. Clean out bleeders and test interior drain tile for correct flow, replace exterior drain tile, backfill to within 12-18" of grade with clear stone backfill. See Appendix A.

Maintenance After Repair:

1. Keep downspouts extended.
2. Maintain positive pitch of grade away from house.

**NO SITE SPECIFIC ENGINEERING REQUIRED**

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**9. CONDITION: Walls sheared at base / Wall slide less than 1/2"**

Characteristics:

Wall shearing or sliding usually occurs at the second course from the bottom block. The bottom block is anchored by the floor. Shearing, however, may occur at any level. This condition indicates one section of the wall is sliding off the remaining wall by less than 1/2". There is no evidence of block face failure.

Testing:

Six foot level or plumb line and tape measure to check wall alignment.

Transit or laser level to check wall alignment.

Standard Repairs:

1. Reinforce with engineered steel support restraints every 32 to 48" on center along bowed wall without excavating, grout behind supports. See Wall Reinforcement and Design. See Appendix A.
2. Excavate; straighten as best as possible. Reinforce with recommended engineered steel restraints. Reseal wall. Clean out bleeders and test interior drain tile for correct flow, replace exterior drain tile, backfill to within 12-18" of grade with clear stone backfill. See Appendix A.
3. If bowing in conjunction with wet walls or seepage, include previous repairs and testing. See Appendix B & C.

Maintenance After Repair:

1. Keep downspouts extended.

2. Maintain positive pitch of grade away from house.

### **NO SITE SPECIFIC ENGINEERING REQUIRED**

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#### **10. CONDITION: Walls sheared at base / Wall slide 1/2" or more**

##### Characteristics:

Wall shearing or sliding usually occurs at the second course from the bottom block. The bottom block is anchored by the floor. Shearing, however, may occur at any level. This condition indicates one section of the wall is sliding off the remaining wall by 1/2" or more. Excessive wall slide can cause failure in the block face below and potential basement wall collapse.

##### Testing:

Six foot level or plumb line and tape measure to check wall alignment.

Transit or laser level to check wall alignment.

##### Standard Repairs:

1. Excavate along exterior building perimeter. Straighten block basement wall as best as possible. Replace or repair damaged concrete block. Reinforce with recommended engineered steel restraints. Reseal wall. Clean out bleeders and test interior drain tile for correct flow, replace exterior drain tile, and backfill to within 12-18" of grade with clear stone backfill. See Appendix A.

##### Maintenance After Repair:

1. Keep downspouts extended.
2. Maintain positive pitch of grade away from house.

### **NO SITE SPECIFIC ENGINEERING REQUIRED**

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#### **11. CONDITION: Dropped, settled or rotated footing**

##### Characteristics:

Foundation settlement is indicated by wide horizontal or step wall cracking and cracks in the floor slab, usually adjacent to the basement wall. The wall cracks are usually much wider than would be indicated by typical wall bowing. The wall may be tipped in the direction of foundation settlement, with horizontal wall joints being out

of level. Door jams and windows in the building may be affected by foundation settlement.

Testing:

Six foot level or plumb line and tape measure to check wall alignment.

Transit or laser level to check wall alignment.

Standard Repairs:

1. This repair **REQUIRES SITE SPECIFIC ENGINEERING.**
2. Repair usually accomplished with engineered earth anchors, hydraulically driven pipe piles, drilled caissons, support pads, etc. that are attached to the bottom of the footing.

Maintenance After Repair:

1. Keep downspouts extended.
2. Maintain positive pitch of grade away from house.

**SITE SPECIFIC ENGINEERING REQUIRED**

---

**12. CONDITION: Poured concrete walls with water leakage  
(NO WALL DISPLACEMENT)**

Characteristics:

Shrinkage of concrete often leads to cracks in poured concrete basement walls. Poured concrete walls with little or no steel reinforcement are more susceptible to shrinkage cracking. During periods of heavy rains, water leakage can occur through cracks in the poured walls. Another cause of cracking in poured walls could be due to excessive pressure during backfilling or winter frost.

Testing:

Six foot level or plumb line and tape measure to check wall alignment.

Transit or laser level to check wall alignment.

Standard Repairs:

1. Inject cracks from inside without excavating. Inject per manufacturing specifications.

- a. **STRUCTURAL** REPAIR - epoxy injection for wall repair and water stoppage.
  - b. **NON-STRUCTURAL** REPAIR - polyurethane injection for water stoppage only.
2. Excavate outside, inject cracks or fill cracks with hydraulic cement, seal wall. See Appendix A & B.

#### Maintenance After Repair:

1. Keep downspouts extended.
2. Maintain positive pitch of grade away from house.

#### **NO SITE SPECIFIC ENGINEERING REQUIRED**

---

### 13. **CONDITION: Poured concrete walls, leaning or bowed / wall deflection less than 1"**

#### Characteristics:

One or more walls are bowed or leaning, with signs of current or recent movement. Wall cracks are less than 1/4" wide. The total amount of wall deflection is less than one inch from the original wall construction. Water seepage may be present at the floor line. Previously repaired wall cracks show signs of continued cracking. Horizontal wall cracks are usually associated with bowing and may open and close with the seasons. Vertical wall cracks are usually associated with leaning walls or wall bowing adjacent to wall irregularities. There is no indication of settlement of the wall footings.

#### Testing:

Six foot level or plumb line and tape measure to check wall alignment.

Transit or laser level to check wall alignment.

#### Standard Repairs:

1. Inject cracks from inside without excavating. Inject per manufacturing specifications.
  - a. **STRUCTURAL** REPAIR - epoxy injection for wall repair and water stoppage.
  - b. **NON-STRUCTURAL** REPAIR - polyurethane injection for water stoppage only.
2. If wall is leaning, secure top of wall to prevent further movement. Additional wall reinforcement is not required. See Appendix A for detail.
3. If wall is bowed, reinforce with recommended engineered steel restraints. See Appendix A.

4. If bowing is in conjunction with wet walls or seepage, refer to previous interior drain tile repairs and testing procedures.

#### Maintenance After Repair:

1. Keep downspouts extended.
2. Maintain positive pitch of grade away from house.

### **NO SITE SPECIFIC ENGINEERING REQUIRED**

---

#### **13. CONDITION: Poured concrete walls, leaning or bowed / wall deflection 1" or more**

##### Characteristics:

One or more walls are bowed or leaning, with signs of current or recent movement. Wall cracks may be greater than 1/4" wide. The total amount of wall deflection is one inch or more from the original wall construction. Water seepage may be present at the floor line. Previously repaired wall cracks show signs of continued cracking. Horizontal wall cracks are usually associated with bowing and may open and close with the seasons. Vertical wall cracks are usually associated with leaning walls or wall bowing adjacent to wall irregularities. There is no indication of settlement of the wall footings.

##### Testing:

Six foot level or plumb line and tape measure to check wall alignment.

Transit or laser level to check wall alignment.

##### Standard Repairs:

1. Excavate, straighten as best as possible. Reinforce with recommended engineered steel restraints. Reseal wall. Clean out bleeders and test interior drain tile for correct flow, replace exterior drain tile, backfill trench to within 12-18" of grade with clear stone backfill. See Appendix A.
2. Inject cracks or seal cracks with hydraulic cement in accordance with manufacturer specifications.
3. If bowing is in conjunction with floor seepage, refer to previous interior drain tile repairs and testing procedures.

#### Maintenance After Repair:

1. Keep downspouts extended.

2. Maintain positive pitch of grade away from house.

## **NO SITE SPECIFIC ENGINEERING REQUIRED**

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### **Conclusion**

**SITE SPECIFIC ENGINEERING IS REQUIRED FOR ANY REINFORCEMENT OF BASEMENT WALLS WHERE CONDITIONS DO NOT CONFORM TO THE STANDARDS OF THIS DOCUMENT OR ALTERNATIVE REPAIR METHODS ARE UTILIZED AS FOLLOWS:**

- Internal core filling with concrete and steel rod
- Installation of an exterior grade beam
- Retention anchors installed outside the wall with wall plates
- Construction of additional masonry pilasters on inside or outside of wall
- Installation of an epoxy fiber membrane on inside or outside of wall across cracked areas
- Any other methods or materials used for foundation repairs

**DISCLAIMER: Jendusa Engineering Assoc., Inc., Wisconsin Association of Foundation Repair Professionals (WAFRP), and anyone associated with Jendusa Engineering Assoc., Inc. and WAFRP assumes no liability, damages, or claims arising from any use of these specifications and engineering regarding repair procedures and specifications.**

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March - 2003

## **APPENDIX A**

### **PROCEDURE FOR WALL REPAIR INCLUDING: EXCAVATION, WATERPROOFING & REINFORCEMENT**

- Excavate a trench on the exterior wall from grade to the top of the footing.
- Haul all excavated clay to an approved landfill.
- Attempt to flush out all bleeders found on exterior footing to sump pump or palmer valve system. Check with local jurisdiction if palmer valve is permitted (per local requirements).
- Flush inside drain tile to sump pump or palmer valve, if applicable, on affected wall.
- Set jacks on the inside of the excavated walls and straighten the walls to the original position, or as close as possible.
- Identify structurally damaged concrete block (exterior and interior). Replace block, or repair with approved epoxy material, or fill block solid with concrete grout.

- Repair all mortar joint cracks on outside of wall with TYPE M masonry cement. Seal coat all excavated walls from the footing to grade with approved below-grade damp proofing material installed per manufacturer's specifications.
  - Replace all removed drain tile on excavated wall with "ADS" polypropylene/fiberglass drain tile and connect to existing bleeders found on footing.
  - Backfill trench with 3/4" to 1" clear crushed aggregate to within 12 to 18 inches from finish grade at all grass/dirt areas.
  - Install a below grade geotextile filter fabric with minimum 6 oz. density on top of stone backfill at all grass/dirt areas to prevent dirt contamination of the clear stone due to water filtration to exterior drain tile.
  - Finish backfilling trench areas with impervious fill to within 6" of ground surface, place topsoil to finish grade height and pitch soil away from building.
  - Reinforce all excavated wall with steel reinforcing columns. (See [reinforcement detail list](#) for size, spacing, and attachment) Grout between steel columns and wall with a non-shrink grout to account for wall irregularities and tilt.
  - Extend wall reinforcement beam 1 space in each direction beyond damaged section of wall.
  - Tuckpoint all interior mortar joint cracks on all walls that are repaired.
- 

## APPENDIX B

### PROCEDURE FOR INTERIOR DRAIN TILE REPAIR WITHOUT EXCAVATION

- Remove floor along wall area (12" to 18" wide) to be repaired to allow replacement of interior drain tile. NOTE: Depending on the exterior ground pressure against the wall, bracing of the bottom 1/3 of the wall may be required to prevent the first course from moving after the floor has been removed.
  - Remove existing drain tile and flush with water to sump crock or palmer valve. Check for correct drainage. Check with local jurisdiction if palmer valve is permitted (per local requirements).
  - Replace drain tile at floor removal area with polypropylene drain tile and encase new tile with proper filtering stone.
  - Drill one (3/4 to 1 inch) drainage hole into the bottom of first course per core, under floor line, for block drainage. Holes shall be cleared for proper drainage.
  - Wall drainage board shall be a one-piece unit. Wall drainage board to be installed at least 1" minimum higher than finish floor height and against first course to assure unrestricted passage of water flow. The wall drainage board MUST provide lateral support to first block. Wall drainage board must be able to be sealed off to provide radon mitigation if necessary.
  - Test wall drainage board: Drill holes at the third to fourth block above the footing and every 3 to 4 feet horizontally for the entire wall where possible. Flush wall with water by inserting hose into injection holes. Check for unobstructed flow to wall drainage board by observing water flow at the base of the wall.
  - Replace floor where removed. Minimum thickness not to be less than 1" from existing thickness.
-

## APPENDIX C

### Approved Drainage Board Products

[Floor Edging](#), Manufactured by Masonry Technology Incorporated.

[SHAD](#).

Additional drainage board products may be used with approval from WAFRP. Contact WAFRP Chairman, Robert Zidar at (262) 827-5000.