

ZONING

105 Attachment 1

Town of Greenfield

Appendix A Mobile Home Foundation System

(Source: New York Manufactured Housing Association)

1.0. Site preparation.

- 1.1. The mobile home site must be prepared by removing grass and organic material and backfilling with compacted gravel to a minimum of four inches above finished grade. Grade and slope the gravel to prevent water accumulation beneath the home.
- 1.2. Foundation.
 - 1.2.1. The mobile home foundation system constitutes a load-bearing support system for the mobile home. The owner shall be permitted to design for and specify the installation of any foundation system which meets the design requirements of this specification. The foundation system shall be installed as specified in this section or be designed by a professional engineer registered in the State of New York.
 - 1.2.1.1. Footings and foundations, unless otherwise specifically provided, shall be constructed of masonry, concrete or hardwood (oak, etc.), in conformance with this specification. The footings shall rest on undisturbed soil or engineered fill and be capable of transferring all design loads imposed by or upon the structure into soil or bedrock without failure or exceeding the safe bearing capacity of the supporting soil.
 - 1.2.2. Footings.
 - 1.2.2.1. The load-bearing capacity of individual load-bearing piers and their footings shall be not less than the combined live and dead loads as specified in this specification. Footings shall be adequate in size to withstand the contributing live and dead loads of the mobile home and any other impede loads. Footings or pier foundations, unless otherwise approved by a registered professional engineer or architect, shall be placed level on firm undisturbed soil or on engineered fill, which is free of grass and organic materials, compacted to 95% proctor to a minimum of load-bearing capacity at 1,000 pounds per square feet. Where unusual conditions exist, the spacing of piers and the load-bearing capacity of the soil shall be determined specifically for such conditions. Concentrated roof loads may require special consideration.

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- 1.2.2.2. Footings shall bear on at least 144 square inches of solid concrete, concrete blocks or other materials approved for the intended use by the authority having jurisdiction.
- 1.2.2.3. If footings are placed on a frost-susceptible soil, such as clay or silt, in areas when temperatures go below freezing, heaving and/or settlement may occur and periodic releveling of the home may be necessary.
- 1.2.2.4. Should the owner select a permanent foundation, it shall consist of concrete footings below the frost line. Drawings must be prepared by a professional engineer licensed in the State of New York.

1.2.3. Piers.

- 1.2.3.1. Piers shall be designed and constructed to distribute loads evenly. Multiple-section homes may have concentrated roof loads which will require special consideration. Load-bearing piers shall be constructed utilizing one of the following methods:
 - (a) A prefabricated load-bearing device that is listed and labeled for the intended use.
 - (b) A pier designed by a registered professional engineer or architect.
 - (c) A pier constructed with concrete blocks conforming to ASTM C-90, laid with mortar joints or approved structural masonry adhesive. Blocks shall not be less than a nominal eight inches in width and 16 inches in length. Mortar mix shall be Type S or one part portland cement, 1/2 part hydrated lime and four parts sand by volume. Lime shall not be used with plastic or waterproof cement.
 - (d) A pier constructed with nonmortared concrete blocks and a separate anchoring system, conforming to the following criteria:
 - (1) Concrete blocks are to be a nominal eight inches by eight inches by 16 inches, conforming to ASTM C-90 with open cells vertical, stacked true and plumbed with a maximum horizontal block offset of 1/2 inch from the top to the bottom of the pier. The maximum height of the pier shall be 36 inches designed by a professional engineer or architect. Single-stacked block piers shall be installed with the sixteen-inch dimension perpendicular to the main (I-beam) frame. The piers shall be covered with a wood

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or concrete cap of two inches by eight inches by 16 inches.

- (2) Concrete block shall be stable and firm on the footing with all bearing surfaces clean and smooth.
- (3) The maximum vertical load shall not exceed 6,400 pounds per pier.
- (4) Nonmortared piers shall not carry any vertical uplift, moment or horizontal load.
- (5) Tie-downs and anchors shall be designed to resist all uplift loads not offset by 2/3 of the mobile home dead load and all horizontal loads in zoned areas per New York State Uniform Fire Prevention and Building Code.
- (6) The width of the main-frame I-beam flange shall not be less than two inches.
- (7) Concrete cast shall be the same as the supporting concrete block and a minimum of two inches thick conforming to ASTM C-145 and may be used with leveling spacers of steel or decay-resistant wood which shall be level.
- (8) Pier footings shall be on firm undisturbed soil or engineered fill.
- (9) The top surface of the footing shall be smooth, clean and level, providing a minimum of 50% direct bearing of concrete block on the top surface of footing. Caps and leveling spacers may be used for leveling of the mobile home. Where unusual conditions or loads exist, the spacing of piers and the load-bearing capacity of the soil shall be determined specifically for such conditions or loads.

1.2.4. Plates and shims.

- 1.2.4.1. A wood plate not exceeding two inches in thickness and shims not exceeding one inch in thickness shall be permitted to be used to fill any gap between the top of the pier and the main frame. Two-inch or four-inch solid concrete blocks shall be permitted to be used to fill the remainder of any gap. Shims shall be at least nominal four inches wide and six inches long and shall be fitted and driven tight between the wood plate or pier and main frame.

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1.2.5. Soil-bearing capacity.

1.2.5.1. The following table may be used if the soil type is known. If the soil type is unknown, the following resources may be consulted to determine the soil type/bearing capacity: (a) local authority having jurisdiction; (b) Soil Conservation District; (c) United States Geological Survey; (d) the Soil Conservation Service of the United States Department of Agriculture; and (e) Highway Department. If none of the above resources can provide information on the soil type, a qualified professional engineer can be used to determine the soil type.

Table 1

Class of Materials	Allowable Foundation Pressure (pounds per square foot)
Clay, sandy clay, silty clay and clayey silt	1,000
Sand, silty sand, clayey sand, silty gravel and clayey gravel	1,500
Loose sand-clay soil or medium soft clay	2,000
Firm or stiff clay	3,000
Loose fine sand or compact sand - inorganic	4,000
Compact sand-clay soil	6,000
Loose coarse-to-medium sand or medium compact fine sand	8,000

1.2.5.2. Where natural soils or controlled fills cannot meet this design, a prepared surface shall be provided to a sufficient depth to meet the minimum load-bearing capacity specified herein.

1.3. Live and dead loads.

1.3.1. The foundation system shall be designed and constructed to sustain all dead and live loads imposed thereon. The dead load used in the design shall be the actual weight of the mobile home unit to be installed. The live load, including wind and uplift, and snow loads used in the design shall be those set forth in this specification. Uplift due to overturning forces shall be adequately resisted by the anchoring system in zone areas per the New York State Uniform Fire Prevention and Building Code.

1.3.2. For the purpose of determining stresses, all vertical design loads, including roof live loads, shall be considered as acting simultaneously. In computing the effect of wind force in combination with vertical loads, roof live loads need not be included, except that where snow loading is required in the

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design of the roof, at least 50% of such snow load shall be considered acting in combination with the wind load.

- 1.3.3. All allowable stress- and soil-bearing values may be increased 1/3 when considering wind forces. No increase will be allowed for vertical loads acting alone.
- 1.3.4. Where natural soils or controlled fill (free of grass and organic material) is used, it shall support the loads imposed by the support system of the mobile home placed thereon. The required load-bearing capacity shall be calculated based on the design loads shown in Table 2.

Table 2
Mobile Home Standard Load-Bearing Calculations

Roof live load	50
Roof dead load	5
Floor live load	40
Floor dead load	10
Design distributed load	105

Table 3 shall be applicable unless the entire support system is designed and calculated by a registered professional engineer or architect.

ADDENDUM NO. 1: NEW YORK STATE MOBILE HOME ASSOCIATION

Mobile Home Foundation System.

Add beneath Tables 2 and 3: Reprinted with permission from NFPA 501A-19S2 Mobile Home Installations, copyright 1982 NFPA and NCSRCS National Fire Protection Association, Quincy, Massachusetts 02269, and National Conference on State Building Code and Standards printed in Virginia. This reprinted material is not the complete and official position of the NFPA or NCSBCS on the referenced subject which is represented only by the standard in its entirety.

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**Table 3
Designed Footing Areas for Allowable Soil-Bearing Capacity
One Story Only**

Roof live load: 20 pounds per square foot						Roof live load: 30 pounds per square foot					Roof live load: 50 pounds per square foot				
South zone: 75 pounds per square foot						Middle zone: 85 pounds per square foot					North zone: 85 pounds per square foot				
Width of units up to and including (feet)**	12	14	12	14	Multiple-section homes***	12	14	12	14	Multiple-section homes***	12	14	12	14	Multiple-section homes***
Tributary pier spacing (feet)**	6	6	8	8		6	6	8	8		6	6	8	8	
Pier load (pounds)**	2,700	3,150	3,600	4,200		3,060	3,570	4,080	4,760		3,420	3,900	4,560	5,320	
Allowable Soil-Bearing Capacity (pounds per square feet)						Minimum Required Footing Area (square inches)									
1,000	389	454	518	605		441	514	588	685		493	575	657	766	
1,500	259	302	346	403		294	343	293	457		328	383	438	511	
2,000	194	227	259	302		220	257	294	343		246	287	328	383	
3,000	*	151	173	202	*	147	171	196	229		164	192	219	255	
4,000	*	*	*	151	*	*	*	*	*	*	*	*	164	192	*
6,000	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
8,000	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

NOTES:

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- (a) Rear cantilever of floor beyond the frame is assumed to be less than two feet.
- (b) For units wider than the dimensions show in Table 3, an engineering analysis will be needed to determine pier spacing.
- (c) Individual supports shall not bear a load greater than 6,400 pounds.
- (d) If sheathed rock with shingles is used, an additional five pounds per square foot should be added to the roof design dead load.
- * Minimum required footings shall not be less than 144 inches (one square foot). All values above 144 inches shown.
- ** If unit(s) is supplied with overhang eaves, add an additional 200 pounds per pier.
- *** See the appropriate column for individual section width selected.
Multiple-section homes may have concentrated roof support which will require special consideration such as piers along marriage line.