

Diane N. Tradd
Assistant City Manager/DPD Director

R. Eric Slagle
Director of Development Services

Shaun Shanahan
Building Commissioner

MEMORANDUM

TO: Kevin Murphy, City Manager
Diane Tradd, DPD Director

FROM: R. Eric Slagle, Director of Development Services

RE: **MOTION BY MAYOR KENNEDY - REQ. CITY MGR. HAVE THE PROPER DEPARTMENT EXPLORE THE REMOVAL OF A TRAILER AT OR NEAR 592 VARNUM AVENUE.**

This memorandum addresses the request from Mayor Kennedy regarding the removal of a trailer at or near 592 Varnum Ave. Development Services was subsequently informed that the property in question was 914 Varnum Avenue. Please note that the property was originally numbered 902 Varnum Avenue, but was subsequently renumbered 914 Varnum Avenue by the City Engineer's Office.

BACKGROUND

The original structure on the property at 902 Varnum Avenue was a single family home built in 1930. On or about November 24, 2013, the home was struck by a motor vehicle, doing significant damage to the front wall of the residence. A structural evaluation of the property was conducted over several months, and a report was prepared declaring the home uninhabitable. See July 11, 2014 Report from H-Star Engineering, Inc., attached hereto as Exhibit A. In the meantime, a temporary trailer was installed at the property for the elderly resident. See July 7, 2014 Electrical Permit, attached hereto as Exhibit B. That temporary trailer has since been removed from the site.

On October 8, 2014, as a result of the July 11, 2014 Report, Building Commissioner Shaun Shanahan issued an order requiring demolition within 30 days. See October 8, 2014 Order, attached hereto as Exhibit C. This order was issued due to the extensive damage to the structural integrity of the house. In March of 2015, the property owner began the process of applying for the demolition permit for the unsafe structure. That permit was issued on June 24, 2015. See June 24, 2015 Demolition Permit, attached hereto as Exhibit D. The structure was subsequently demolished.

On or about June 19, 2015, the property owner applied for a building permit to construct a manufactured home on the property. The permit was issued on December 22, 2015. See December 22, 2015 Building Permit, attached hereto as Exhibit E. Prior to the issuance of the Building Permit, the proposed structure was reviewed by the Building Commissioner for zoning compliance and was put before the Conservation Commission for their review.

CONSERVATION COMMISSION

On August 17, 2015, the property owner submitted a Notice of Intent to the Conservation Commission. See August 17, 2015 Notice of Intent, attached hereto as Exhibit F. The property is partially within the floodplain, and therefore the property owner proposed compensatory flood storage for the portion of the project that would impact the floodplain. The application was heard by the Conservation Commission on September 9, 2015 and continued to September 23, 2015, where the Order of Conditions was approved unanimously. See Minutes for September 9, 2015 and September 23, 2015 Conservation Commission meeting, attached hereto as Exhibit G. Based on the compensatory flood storage provided and his review of the documents submitted in the Building

Permit application, the Building Commissioner made the determination that the proposed structure was compliant with the City's Floodplain Regulations.

ZONING

The City's Zoning Ordinance has two distinct sections which would potentially impact the proposed structure on the lot. The first is Article II Definitions – Dwelling, Single Family: “A detached dwelling, other than a mobile home designed for or occupied by one (1) family.” This language was added to the Zoning Ordinance in 1987, a date which becomes important below. The second is Article 9.1.4 Definitions – Manufactured Home: “A structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities.” This is consistent with the definition found in the Massachusetts General Laws, which states that,

...the words “manufactured home” shall mean a structure, built in conformance to the National Manufactured Home Construction and Safety Standards which is transportable in one or more sections, which in the traveling mode, is eight body feet or more in width or forty body feet or more in length, or, when erected on site, is three hundred twenty or more square feet, and which is built on a permanent chassis and designed to be used as a dwelling unit with or without a permanent foundation when connected to the required utilities, and includes the plumbing, heating, air conditioning, and electrical systems contained therein. MGL c. 140, §32Q

The two separate sections in the Zoning Ordinance, one discussing ‘mobile homes’ and one discussing ‘manufactured homes’, have important implications. First, by using two distinct terms, the implication is that each term has a separate meaning. Second, and more importantly, while Article II bans a mobile home as a single family dwelling within the City, Article 9.1 specifically discusses the review by both the Building Commissioner and the Conservation Commission to allow a manufactured home development in the floodplain. See Article 9.1.6. Therefore, logically, a mobile home and a manufactured home must have meant two different things, in order for each of these sections to have meaning. Thus, in order to comply with the Zoning Ordinance, the Building Commissioner was required to make a determination as to whether the proposed structure was a mobile home or a manufactured home.

BUILDING COMMISSIONER DETERMINATION

In order to determine if the proposed structure was compliant with the Massachusetts Building Code and allowed under the City's ordinances, the Building Commissioner reviewed multiple documents and did extensive research. He relied on both the local and state definitions of manufactured homes, which the proposed structure fully complied with. The structure was transported in one section, was 13' x 56', which met the size requirements for a manufactured home, was greater than 320 sq. ft. in area, was on a permanent chassis, and was to be attached to a permanent full foundation with full utility hook ups. See photographs of utility and foundation connections attached hereto as Exhibit H. Among the documents reviewed by the Building Commissioner were the proposed site plan (attached hereto as Exhibit I), the floor plan of the proposed structure (attached hereto as Exhibit J), and the Installation Manual (attached hereto as Exhibit K), and the Manufactured Home certification (a photo of which is attached hereto as Exhibit L).

In addition, the Building Commissioner evaluated the differences between a mobile home and a manufactured home. He reviewed the NADA Guidelines on the differences between a mobile home, a manufactured home, and a modular home. See NADA Guide – Manufactured, Mobile and Modular Homes attached hereto as Exhibit M. Similar information is readily available across the internet. To summarize the findings, mobile homes are structures built prior to 1976, built either without a particular code, or under the RVIA (the Recreational Vehicle code), typically have a VIN number, are considered personal property, and are financed as an automobile. Manufactured homes, on the other hand, only existed after the adoption of the HUD Code in 1976, which required traditional building code standards, do not have a VIN number, and are considered real estate for both tax and financing purposes. The 1976 date is important, because it means that as of that date, there was a specific delineation between mobile homes and manufactured homes. So when the Zoning Ordinance was amended in 1987 to add a ban on mobile homes, and not manufactured homes, the exclusion of manufactured homes from the ban means that they would be allowed.

Based on the entirety of the documentation presented to him, the Building Commissioner made the determination that the proposed structure was a manufactured home, and not a mobile home, and was therefore allowed by the Zoning Ordinance. As such, the building permit was approved, and the foundation and structure were installed on the property.

ES

1/22/2015

H-STAR ENGINEERING, INC
200 Greenville Road
New Ipswich, NH 03071
(978) 973-3078
email: HSTAR@att.net

11 July 2014

RE: Assessment of Structural Damage at 902 Varnum Ave., Lowell, MA. (Reference: 29 Jan. 2014 Damage Report by C.A. Pretzer Assoc., Inc.)

Dear Sirs,

The purpose of this report is to outline Structural damage observed during my inspection on 7 July 2013 of the dwelling located at 902 Varnum Ave., Lowell, MA shown on the attached map. This report was prepared for the current owner Charles Beauchesne.

On 24 Nov. 2013, the front wall of the residence was struck by a vehicle. The vehicle smashed through the front wall and penetrated into the dwelling.

The damaged residence was evaluated by C.A. Pretzer Assoc., Inc. (David Grandpre, PE) on 28 Jan. 2014. Extensive photographs of the damage were taken. The report indicated substantial damage to front gable wall as well as interior walls. The report also noted existing structural damage due to both a lack of maintenance and insect activity. We concur with these initial findings.

Further investigation (following exposure of the interior wall and ceiling coverings by the contractor) indicates a slight shifting of the house on the foundation, increased buckling and cracking of structural members, increased eccentricity of support columns, and increased sagging of the roof structure. Prior to impact, the house had structural deficiencies, but was habitable. However, the weaknesses noted throughout were exacerbated by the impact. At this point, the dwelling is virtually uninhabitable. Repairs do not appear to be economically feasible. Most likely, the City of Lowell Building Dept. will condemn the dwelling. Tear-down and replacement appears to be the sole option.

Photographs are provided for your convenience. If you have any questions or require additional information, please contact me at your earliest convenience.

Sincerely,

Bernard H. Hamill

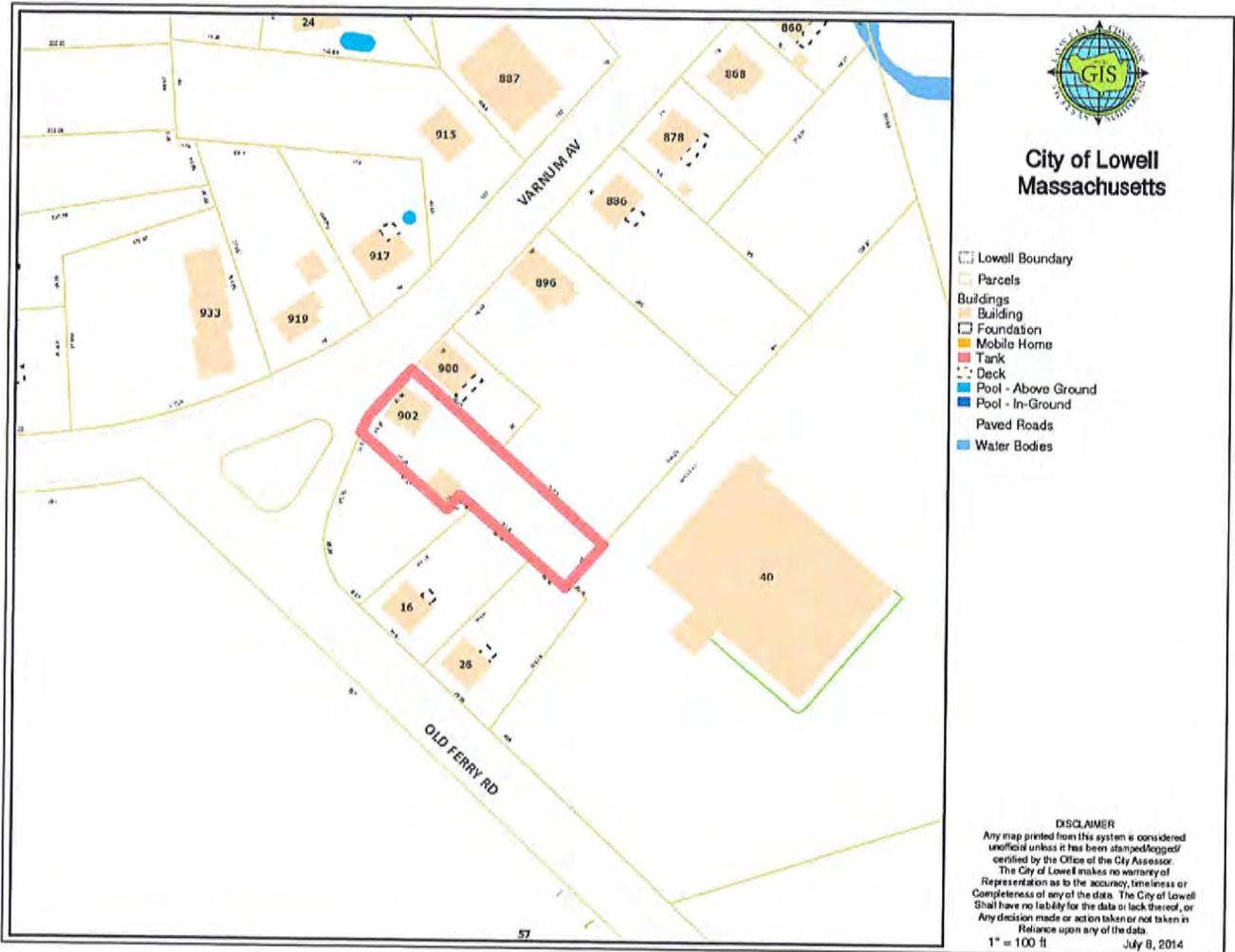
Bernard H. Hamill, PE, RLS

Attachments

1. GIS Location Sketch
2. Damage Photos



Site Sketch
 902 Varnum Ave.
 Lowell, MA



Damage Photos
902 Varnum Ave.
Lowell, MA

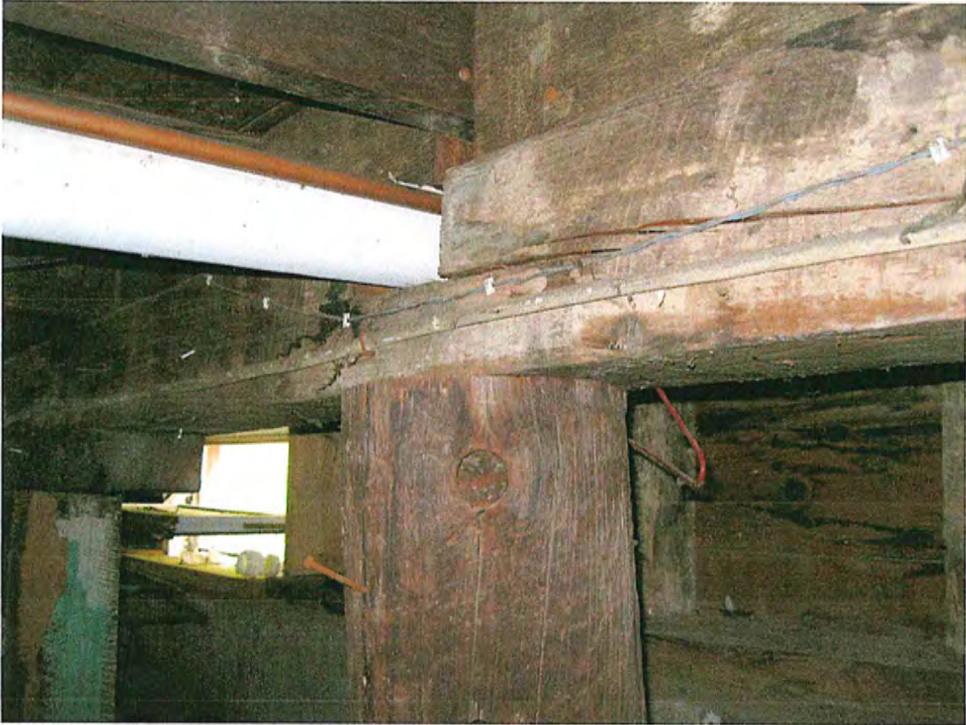


Impact Area (front) – Photo 1



Roof Sag – Photo 2

Damage Photos
902 Varnum Ave.
Lowell, MA



Shifted Column & Damage Beam – Photo 3

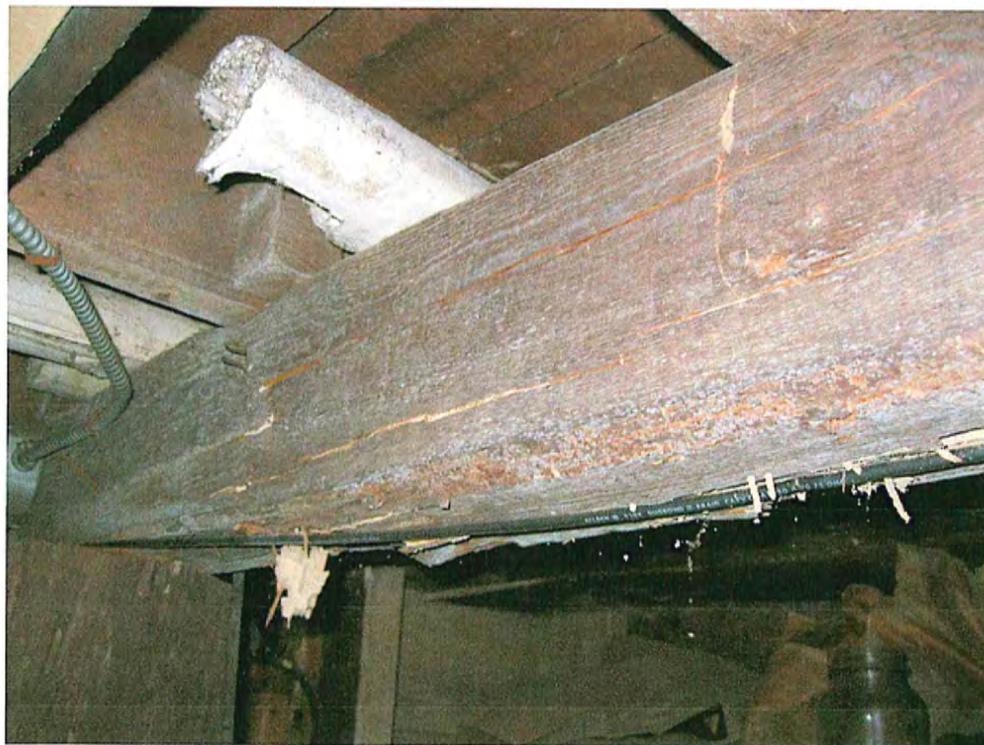


Shifted Lally Column – Photo 4

Damage Photos
902 Varnum Ave.
Lowell, MA

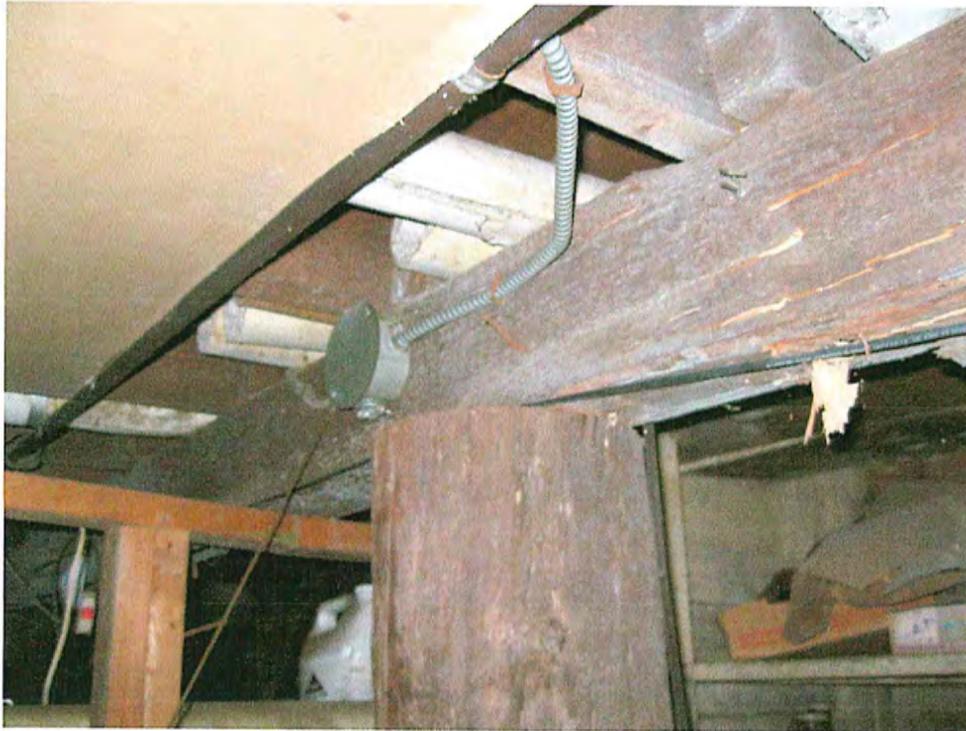


Shifted Sill w/ Pre-Existing Insect & Water Damage – Photo 5



Damaged Beam w/ Expanded Cracking – Photo 6

Damage Photos
902 Varnum Ave.
Lowell, MA



Shifted Column w/ Expanded Beam Cracks – Photo 7



Shifted Floor Joist w/ Pre-Existing Water Damage – Photo 8

Damage Photos
902 Varnum Ave.
Lowell, MA



Buckling of Frame & Siding (left side) – Photo 9



Damage to Front Ridge w/ Partial Separation – Photo 10



City of Lowell
Division of Development Services

Permit E-201408140
ELEC TEMPORARY SERVICE
@902 VARNUM AVE

Per Application # 62875			Permission is Hereby Granted To:	
Issued: 07/07/2014	Expires:	Permit Fee(s): \$ 80.00	ELECTRICAL CONTRACTOR R & L BERUBE ELECTRIC SERVICE INC. PO BOX 537 DRACUT, MA 01826 978-453-2338	
Assigned Inspector: Doug Collupy			TRADESMAN INFORMATION RONALD R BERUBE Lic Type: ELCM Lic No: 12171 Expiring: 07/31/2016	
To Perform Work at the Following Location:				
902 VARNUM AVE Parcel ID: B03045 Owned By: BEAUCHESNE CHARLES R				
Description of Work to be Performed:				
100A T4EMP SERVICE TO WIRE MOBIL HOME				
Subject to These Restrictions: (NOTE: Work is only permitted between: Monday - Saturday, 7:00AM - 8:00PM)				

**** YOU ARE REQUIRED TO CALL YOUR ASSIGNED INSPECTOR (above) to schedule required inspections ****

CALL (978) 674-4144 TO SCHEDULE AN INSPECTION

"Persons contracting with unregistered contractors do not have access to the guaranty fund" (as set forth in MGL c.142A). If this Permit is not exercised within 6 months from the Issue Date, it will expire per 780 CMR Article 105.3.2 of MA State Building Code. All work is to conform to Massachusetts 527 CMR 1200.

Approval Signature Required
Issued on: 7/7/2014 12:00:00AM
Printed on: 7/8/2014 @ 1:17:27PM
Ernest D. Collupy Jr.

**This Permit May Be Revoked By The City Of Lowell
Upon Violation Of Any Of Its Rules Or Regulations**



October 8, 2014

Mr. Charles R Beauchesne
902 Varnum Ave.
Lowell, MA 01852

Re: Dangerous & Unsafe Structure
902 Varnum Ave
Lowell, MA 01852

Diane N. Tradd
Assistant City Manager/Director

R. Eric Slagle
Director of Development Services

Shaun Shanahan
Acting Building Commissioner

Dear Mr. Beauchesne:

On Thursday October 2, 2014, I conducted an inspection of the vacant Residential building known as the 902 Varnum Ave I noticed during my inspection that damage to the supporting structure was clearly evident causing the N.E. wall and ceiling to be inadequately supported.. The original roof structure which provided lateral support to the end wall and front facing wall have been compromised by the recent motor vehicle accident .During my investigation it was discovered that the installation of any compensating elements to insure the continued stability of the structure would be hampered by the deterioration of supporting elements due to insect infestation diminishing the integrity of the structure. Consequently over time, these structural elements would exceed any allowable tolerances and construction methods adhered to in the Massachusetts State Building Codes. It is in My opinion That this structure is inhabitable and has the potential to cause bodily harm to life and limb therefor will be labeled as condemned. This Office shall post the building with identifying placards as well as inform all Emergency personnel of our findings. in accordance with Massachusetts State Building Code (Building Code), Section 116, I hereby direct you to:

- 1) Within twenty-four (24) hours receipt of this Notice, restrict access by vehicles and pedestrians to the area (full width) and or abutting properties. This protection should consist of a fence of six feet (6') minimum height.
- 2) Within thirty (30) days receipt of this Notice, you must either raze the unstable structure or otherwise make the structure safe. Any proposed removal and/or repair plans must be reviewed and approved by the Development Services Division as part of obtaining all appropriate permits which will be required prior to the start of any such removal and/or repair.

In accordance with Section 117.3 of the Building Code, failure to comply with the requirements of this Notice may cause the City to remove the structure or make emergency repairs and lien and/or add to the tax bill for this property in an amount equal to the costs of such removal and/or repairs.

You have the right to contest this order through a hearing before the Division of Development Services. The request for a hearing must be made in writing, within seven (7) days of receipt of this letter, and sent to:

Division of Development Services
Department of Planning & Development
Attn: Shaun Shanahan, Building Commissioner
375 Merrimack Street
Lowell, MA 01852

If you request a hearing, you will be informed of the hearing date, time, and place, and of your right to inspect all public records concerning the matter. You also have the right to be represented at the hearing. If you have any questions regarding this notice or the process for requesting a hearing, please contact me at 978-674-4145.

Sincerely,

Shaun Shanahan,
Building Commissioner, Inspector of Buildings

cc: City Solicitor

CERTIFIED MAIL 7005182000047826455
REGULAR MAIL



City of Lowell

Division of Development Services

Permit B-201506820
 DEMOLITION 1-3 STORIES
 @902 VARNUM AVE

***** THIS PERMIT MUST BE POSTED SO THAT IT IS VISIBLE FROM THE STREET *****

Per Application # **77379**

Project: **DEMOLITION 1-3 STORIES**
 Issued: **06/24/2015** Expires: **12/21/2015** Application Fee: **\$ 75.00**
 Assigned Inspector: **MARTIN FURTADO 978-674-1454**

To Perform Work at the Following Location:

902 VARNUM AVE
 Parcel ID: **B03045**
 Owned By: **BEAUCHESNE CHARLES R**

Description of Work to be Performed:

REMOVE CONDEMED STRUCTURE FOR UNSAFE BUILDING

Permission is Hereby Granted To:

GENERAL CONTRACTOR
 DOWLING, JOHN F.
 75 DUNBAR AVE
 LOWELL, MA 01854
 978-479-2411

TRADESMAN INFORMATION
 JOHN F DOWLING
 Lic Type: **CSL**
 Lic No: **032079** Expiring: **12/03/2015**

Subject to These Restrictions: *(NOTE: Construction is only permitted between: Monday - Saturday, 7:00AM - 8:00PM)*

ELECTRICAL	GAS	PLUMBING	BUILDING
BUILDING PERMIT ONLY	BUILDING PERMIT ONLY	BUILDING PERMIT ONLY	<i>Foundation is ONLY Applicable to a Foundation Permit</i>
Service:	Meter:		Excavation:
Rough:	Rough:	Rough:	Footings:
Final:	Final:	Final:	Rough Frame:
			Fireplace/Chimney
ASSESSOR	FIRE	MECHANICAL	Fire Blocking:
Final:	Oil:	Rough:	Insulation:
Cost Estimate for Permit: \$ 10,000	Smoke:	Final:	Final:
BUILDING PERMIT ONLY	Alarm:	HEALTH	BUILDING PERMIT ONLY
	Sprinklers:		201506820

**** YOU ARE REQUIRED TO CALL YOUR ASSIGNED INSPECTOR (above) in order to schedule required inspections ****

"Persons contracting with unregistered contractors do not have access to the guaranty fund" (as set forth in MGL c.142A). If this Building Permit is not exercised within 6 months from the Issue Date, it will expire per 780 CMR Article 105.3.2 of MA State Building Code. All work is to conform to Massachusetts 8th Edition Bldg. Code 780 CMR.

Approval Signature Required
 Issued on: **6/24/2015 12:00:00 AM**
 Printed on: **6/24/2015 @ 3:11:11 PM**


**This Permit May Be Revoked By The City Of Lowell
 Upon Violation Of Any Of Its Rules Or Regulations**



City of Lowell

Division of Development Services

Permit B-201515124
BUILDING PERMIT
@914 VARNUM AVE

***** THIS PERMIT MUST BE POSTED SO THAT IT IS VISIBLE FROM THE STREET *****

Per Application # 77399
Project: NEW SINGLE FAMILY
Issued: 12/22/2015 Expires: 06/19/2016 Application Fee: \$ 275.00
Assigned Inspector: MARTIN FURTADO 978-674-1454
To Perform Work at the Following Location:
914 VARNUM AVE Parcel ID: TEMP-B03045-1 Owned By: OWNER UNKNOWN
Description of Work to be Performed:
NEW MODULAR HOME 14' X 62' WITH FARMERS PORCH

Permission is Hereby Granted To:
<u>GENERAL CONTRACTOR</u> DOWLING, JOHN F. 75 DUNBAR AVE LOWELL, MA 01854 978-479-2411
<u>TRADESMAN INFORMATION</u> JOHN F DOWLING Lic Type: CSL Lic No: 032079 Expiring: 12/03/2015

Subject to These Restrictions: (NOTE: Construction is only permitted between: Monday - Saturday, 7:00AM - 8:00PM)

ELECTRICAL	GAS	PLUMBING	BUILDING
<i>BUILDING PERMIT ONLY</i>	<i>BUILDING PERMIT ONLY</i>	<i>BUILDING PERMIT ONLY</i>	<i>Foundation Is ONLY Applicable to a Foundation Permit</i>
Service: Rough: Final:	Meter: Rough: Final:	Rough: Final:	Excavation: Footings: Rough Frame: Fireplace/Chimney Fire Blocking: Insulation: Final:
ASSESSOR	FIRE	MECHANICAL	
Final: Cost Estimate for Permit: \$ 25,900	Oil: Smoke: Alarm: Sprinklers:	Rough: Final:	<i>BUILDING PERMIT ONLY</i> 201515124
<i>BUILDING PERMIT ONLY</i>		HEALTH	

**** YOU ARE REQUIRED TO CALL YOUR ASSIGNED INSPECTOR (above) in order to schedule required inspections ****

"Persons contracting with unregistered contractors do not have access to the guaranty fund" (as set forth in MGL c.142A). If this Building Permit is not exercised within 6 months from the Issue Date, it will expire per 780 CMR Article 105.3.2 of MA State Building Code. All work is to conform to Massachusetts 8th Edition Bldg. Code 780 CMR.

Approval Signature Required
Sharon Shomaker
 Printed on: 1/21/2016 @ 8:38:02AM

**This Permit May Be Revoked By The City Of Lowell
 Upon Violation Of Any Of Its Rules Or Regulations**

H-STAR ENGINEERING, INC.

200 Greenville Road
New Ipswich, NH 03071
(978) 973-3078
(HSTAR@ATT.NET)

17 Aug. 2015

Lowell Conservation Commission
Lowell City Hall
Lowell, MA

RE: Submittal of Notice of Intent for 902 Varnum Ave., Lowell, MA

Dear Sirs:

We are pleased to submit a Notice of Intent for the site at 902 Varnum Ave. Attached is a Site Plan dated 17 Aug. 2015 which proposes work in a Flood Plain with volume compensation. Additional supporting documentation is also provided. We look forward to meeting with you on 9 Sept. 2015. Please notify my office if a site visit is required prior to the hearing.

Sincerely,

Bernard H. Hamill, PE, RLS

cc:
Charles Beauchesne
MA DEP Northeast Regional Office

Attachments

1. Site Plan (17 Aug. 2015; scale 1"=20')
2. Notice of Intent
3. Transmittal Form w/ check copies
4. Land Use Form
5. Project Description w/ Alternative Description
6. Abutters List
7. Abutter Notification
8. USGS Map
9. Flood Map
10. GIS/Assessors Map
11. Endangered Species and Priority Habitat Map
12. Deed



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Lowell

City/Town

Important:
 When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Note:
 Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (Note: electronic filers will click on button to locate project site):

902 Varnum Ave. Lowell 01851
 a. Street Address b. City/Town c. Zip Code
 Latitude and Longitude: 42-38-37.36N 71-21-44.45W
 d. Latitude e. Longitude
 31 902
 f. Assessors Map/Plat Number g. Parcel /Lot Number

2. Applicant:

Charles Beauchesne
 a. First Name b. Last Name
 c. Organization
 113 Forest St.
 d. Street Address
 Lowell MA 01851
 e. City/Town f. State g. Zip Code
 h. Phone Number i. Fax Number j. Email Address

3. Property owner (required if different from applicant): Check if more than one owner

a. First Name b. Last Name
 c. Organization
 d. Street Address
 e. City/Town f. State g. Zip Code
 h. Phone Number i. Fax Number j. Email address

4. Representative (if any):

Bernard Hamill
 a. First Name b. Last Name
 H-Star Engineering
 c. Company
 200 Greenville Road
 d. Street Address
 New Ipswich NH 03071
 e. City/Town f. State g. Zip Code
 978 973-3078 Hstar@att.net
 h. Phone Number i. Fax Number j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

\$ 500.00 \$ 237.50 \$ 262.50
 a. Total Fee Paid b. State Fee Paid c. City/Town Fee Paid



WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Lowell

City/Town

A. General Information (continued)

6. General Project Description:

Raze existing damaged dwelling and place new pre-fabricated single family home with associated utilities and driveway. Some work in the 100 year Flood Plain is required.

7a. Project Type Checklist:

- | | |
|---|---|
| 1. <input checked="" type="checkbox"/> Single Family Home | 2. <input type="checkbox"/> Residential Subdivision |
| 3. <input type="checkbox"/> Limited Project Driveway Crossing | 4. <input type="checkbox"/> Commercial/Industrial |
| 5. <input type="checkbox"/> Dock/Pier | 6. <input type="checkbox"/> Utilities |
| 7. <input type="checkbox"/> Coastal Engineering Structure | 8. <input type="checkbox"/> Agriculture (e.g., cranberries, forestry) |
| 9. <input type="checkbox"/> Transportation | 10. <input checked="" type="checkbox"/> Other |

7b. Is any portion of the proposed activity eligible to be treated as a limited project subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. Yes No If yes, describe which limited project applies to this project:

2. Limited Project

8. Property recorded at the Registry of Deeds for:

Middlesex North

a. County

1852

c. Book

b. Certificate # (if registered land)

384

d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

- Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
- Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Resource Area

Size of Proposed Alteration

Proposed Replacement (if any)

a. Bank

0

1. linear feet

2. linear feet

b. Bordering Vegetated Wetland

0

1. square feet

2. square feet

c. Land Under Waterbodies and Waterways

0

1. square feet

0

3. cubic yards dredged

2. square feet

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.



WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Lowell

City/Town

B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. <input checked="" type="checkbox"/> Bordering Land Subject to Flooding	4500 1. square feet 4 3. cubic feet of flood storage lost	4500 2. square feet 100 4. cubic feet replaced
e. <input type="checkbox"/> Isolated Land Subject to Flooding	0 1. square feet 0 2. cubic feet of flood storage lost	3. cubic feet replaced
f. <input type="checkbox"/> Riverfront Area	Merrimac River 1. Name of Waterway (if available)	

2. Width of Riverfront Area (check one):

- 25 ft. - Designated Densely Developed Areas only
- 100 ft. - New agricultural projects only
- 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: 0 square feet

4. Proposed alteration of the Riverfront Area:

0 a. total square feet 0 b. square feet within 100 ft. 0 c. square feet between 100 ft. and 200 ft.

5. Has an alternatives analysis been done and is it attached to this NOI? Yes No

6. Was the lot where the activity is proposed created prior to August 1, 1996? Yes No

3. Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. <input type="checkbox"/> Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. <input type="checkbox"/> Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. <input type="checkbox"/> Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. <input type="checkbox"/> Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. <input type="checkbox"/> Coastal Dunes	1. square feet	2. cubic yards dune nourishment



WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Lowell

City/Town

B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
f. <input type="checkbox"/> Coastal Banks	1. linear feet	
g. <input type="checkbox"/> Rocky Intertidal Shores	1. square feet	
h. <input type="checkbox"/> Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. <input type="checkbox"/> Land Under Salt Ponds	1. square feet	
	2. cubic yards dredged	
j. <input type="checkbox"/> Land Containing Shellfish	1. square feet	
k. <input type="checkbox"/> Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above	
	1. cubic yards dredged	
l. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	1. square feet	
4. <input type="checkbox"/> Restoration/Enhancement	If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.	
	a. square feet of BVW	b. square feet of Salt Marsh
5. <input type="checkbox"/> Project Involves Stream Crossings		
	a. number of new stream crossings	b. number of replacement stream crossings

C. Other Applicable Standards and Requirements

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

a. Yes No **If yes, include proof of mailing or hand delivery of NOI to:**

**Natural Heritage and Endangered Species Program
Division of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581-3336**

2015
b. Date of map



WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Lowell

City/Town

C. Other Applicable Standards and Requirements (cont'd)

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.C, and include requested materials with this Notice of Intent (NOI); OR complete Section C.1.d, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

1. c. Submit Supplemental Information for Endangered Species Review*

1. Percentage/acreage of property to be altered:

(a) within wetland Resource Area

_____ percentage/acreage

(b) outside Resource Area

_____ percentage/acreage

2. Assessor's Map or right-of-way plan of site

3. Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work ***

(a) Project description (including description of impacts outside of wetland resource area & buffer zone)

(b) Photographs representative of the site

(c) MESA filing fee (fee information available at <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/mass-endangered-species-act-mesa/mesa-fee-schedule.html>). Make check payable to "Commonwealth of Massachusetts - NHESP" and **mail to NHESP** at above address

Projects altering 10 or more acres of land, also submit:

(d) Vegetation cover type map of site

(e) Project plans showing Priority & Estimated Habitat boundaries

d. OR Check One of the Following

1. Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, <http://www.mass.gov/eea/agencies/dfg/dfw/laws-regulations/cmr/321-cmr-1000-massachusetts-endangered-species-act.html#10.14>; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. Separate MESA review ongoing.

a. NHESP Tracking # _____

b. Date submitted to NHESP _____

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/>). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.



WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

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Lowell

City/Town

C. Other Applicable Standards and Requirements (cont'd)

3. Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.
2. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?
- a. Not applicable – project is in inland resource area only
- b. Yes No If yes, include proof of mailing or hand delivery of NOI to either:
- | | |
|---|--|
| South Shore - Cohasset to Rhode Island, and the Cape & Islands: | North Shore - Hull to New Hampshire: |
| Division of Marine Fisheries - Southeast Marine Fisheries Station
Attn: Environmental Reviewer
1213 Purchase Street – 3rd Floor
New Bedford, MA 02740-6694 | Division of Marine Fisheries - North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930 |

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

3. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?
- a. Yes No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.
-
- b. ACEC
4. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?
- a. Yes No
5. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?
- a. Yes No
6. Is this project subject to provisions of the MassDEP Stormwater Management Standards?
- a. Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:
- Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)
 - A portion of the site constitutes redevelopment
 - Proprietary BMPs are included in the Stormwater Management System.
- b. No. Check why the project is exempt:
- Single-family house

Online Users:
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.



WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Lowell

City/Town

C. Other Applicable Standards and Requirements (cont'd)

- 2. Emergency road repair
- 3. Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

- 1. USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)
- 2. Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.
- 3. Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.
- 4. List the titles and dates for all plans and other materials submitted with this NOI.

Site Plan - 902 Varnum Ave., Lowell, MA

a. Plan Title

H-Star Engineering

b. Prepared By

7 Jan. 2015

d. Final Revision Date

Bernard H. Hamill

c. Signed and Stamped by

1"=20'

e. Scale

17 Aug. 2015

f. Additional Plan or Document Title

g. Date

- 5. If there is more than one property owner, please attach a list of these property owners not listed on this form.
- 6. Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.
- 7. Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.
- 8. Attach NOI Wetland Fee Transmittal Form
- 9. Attach Stormwater Report, if needed.



WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Lowell

City/Town

E. Fees

- Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

5205	12 Aug. 2015
2. Municipal Check Number	3. Check date
5204	12 Aug. 2015
4. State Check Number	5. Check date
	Dowling, LLC
6. Payor name on check: First Name	7. Payor name on check: Last Name

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

1. Signature of Applicant	2. Date
3. Signature of Property Owner (if different)	4. Date
5. Signature of Representative (if any)	6. Date

For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a copy of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:

If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File Number
Document Transaction Number
City/Town

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

Charles R. Buchanan

1. Signature of Applicant

17 Aug. 2015

2. Date

3. Signature of Property Owner (if different)

4. Date

5. Signature of Representative (if any)

6. Date

For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:

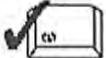
If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands
NOI Wetland Fee Transmittal Form
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Applicant Information

1. Location of Project:

902 Varnum Ave. Lowell
 a. Street Address b. City/Town
 5204 \$ 237.50
 c. Check number d. Fee amount

2. Applicant Mailing Address:

Charles Beauchesne
 a. First Name b. Last Name
 c. Organization
 113 Forest St.
 d. Mailing Address
Lowell MA 01851
 e. City/Town f. State g. Zip Code
 h. Phone Number i. Fax Number j. Email Address

3. Property Owner (if different):

a. First Name b. Last Name
 c. Organization
 d. Mailing Address
 e. City/Town f. State g. Zip Code
 h. Phone Number i. Fax Number j. Email Address

B. Fees

Fee should be calculated using the following process & worksheet. ***Please see Instructions before filling out worksheet.***

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract \$12.50. To calculate the city/town share of the fee, divide the total fee in half and add \$12.50.

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands
NOI Wetland Fee Transmittal Form
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
2A (single family dwelling)	1	\$ 500.00	\$ 500.00
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
Step 5/Total Project Fee:			\$ 500.00
Step 6/Fee Payments:			
Total Project Fee:			\$ 500.00
			a. Total Fee from Step 5
State share of filing Fee:			\$ 237.50
			b. 1/2 Total Fee less \$12.50
City/Town share of filling Fee:			\$ 262.50
			c. 1/2 Total Fee plus \$12.50

C. Submittal Requirements

- a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
 Box 4062
 Boston, MA 02211

- b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a copy of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a copy of this form; and a copy of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

Diane N. Tradd
Assistant City Manager/Director

Eric Slagle
Director of Development Services

Shaun Shanahan
Building Commissioner

MEMORANDUM

DATE: October 27, 2015

TO: Diane Tradd, DPD Director

CC: Eric Slagle, Development Services Director
Shaun Shanahan, Building Commissioner
Swaathi Joseph, Assistant Planner
Judith Tymon, Senior Planner
Christopher McWhite, Building Inspector/Plans Examiner

FROM: Judy Tymon, Senior Planner

RE: September 9, 2015 Conservation Commission Meeting – Meeting Minutes

A quorum of Commissioners was present with Commissioner Lovely, X and X absent. Beidron arrived 7:15.

ORDER OF BUSINESS

Request for Determination of Applicability

Domingos Cavalerio
70 Nina Drive
Tewksbury, MA
Boston, MA

Project Location: 506 Lawrence St.

Removal of a shed and relocation of a fence, both located on City property within 200 ft. of the Concord River.

The following individuals spoke on behalf of the applicant:

John Cox - attorney

The following individuals offered comments relative to the project:

None

Discussion

Atty. Cox explained that a survey of the property had been completed and found that the shed and the fence are on City property. The applicant will remove both the shed and the fence. The area will be left open and the shed will not be replaced. Commissioner Zacherer explained that the fence is located in the floodplain and he told the applicant that if the fence is to be moved, that the caliper of the posts will have to be measured.

Motion:

K. Biedron made a motion and B. Toner seconded the motion to issue a Negative – 3 Determination. The motion passed unanimously and (4-0).

K. Biedron made a motion and B. Toner seconded the motion to vacate the Enforcement Order. The motion passed unanimously (4 – 0).

Certificate of Compliance

Daly Realty Trust
229 Stedman St.
Lowell, MA
DEP #: 206-0728
Project Location: 40 Hadley Street

The following individuals spoke on behalf of the applicant:

D. Daly – applicant

The following individuals offered comments relative to the project:

None

Discussion

Mr. Daly explained that he had found dead trees on the property and had removed them. He had also slightly increased the size of the garage. The Commission Members commented that the rain garden looked good and asked if an area north of the rain garden could be cleared out to be used as a yard by future homeowners.

Motion:

L. Varnum made a motion and K. Biedron seconded the motion to issue a Certificate of Completion. The motion passed unanimously (4 – 0).

Notice of Intent

Richard Stern
Camelot Court 2 c/o Sutton Management Co., Inc.
200 Sutton St., Suite 95
North Andover, MA
Project Location: 339 Pawtucket Blvd.

Refinish an existing in ground pool, replace deck, fence and associated utilities within bordering land subject to

The following individuals spoke on behalf of the applicant:

M. X Norse Environmental – engineer
X X – Sutton Management Company

Discussion:

Engineer explained that the project consisted of a complete renovation of the pool, including the deck, which will be re-installed in the same footprint. There will be no filling of floodplain, no re-grading, no expansion of the deck and the existing fence posts will remain in place. A new mesh fence will be installed using the existing posts, which will remain in place.

The following individuals offered comments relative to the project:

None

Motion:

XX made a motion and XX seconded the motion to
K. Biedron made a motion and B. Toner seconded the motion to close the public hearing. The motion was unanimous (5 - 0).

K. Biedron made a motion and L. Varnum seconded the motion to issue a Standard Order of Conditions. The motion passed unanimously. (5 – 0). B

B. Toner made a motion and G. McDonough seconded the motion to vacate the Enforcement Order. The motion passed unanimously (5 – 0).

Notice of Intent

Charles Beauchesnes

113 Forest St.

Lowell, MA 01851

Project Location: 902 Varnum Ave..

Raze an existing dwelling unit and replace with pre-fabricated single family home with associated utilities and driveway on a parcel with a portion located within the 100 year floodplain.

The following individuals spoke on behalf of the applicant:

B. Hamil – Engineer.

C. Beauchane – Property Owner.

The engineer presented revised plans which contain the table requested in the DEP comments. The project consists of replacing a damaged dwelling unit with a pre-fabricated unit. The filling will be minimal and flood storage is being provided. The new structure will be built on rails. The total displacement is 27 feet. The driveway will be the same elevation and the new structure is approximately 18 inches wider. C. Zacherer asked where the cut will be between elevation 98 and 99. The finished contour is shown but the actual cut is not shown. The plan will need to show the area with hatching and will need a profile to show the cutting and filling at all grade changes.

The following individuals offered comments relative to the project:

None

Motion:

K. Biedron made a motion and B. Toner seconded the motion to continue public hearing. The motion passed unanimously (5 – 0).

Notice of Intent

Institute Associates of Lowell, INC

31 Kirk St.

Lowell, MA 01852

Project Location: 34-2 Berry Road

Site grading and construction of single family home within a riverfront area.

Notice of Intent

Institute Associates of Lowell, INC

31 Kirk St.

Lowell, MA 01852

Project Location: 34-3 Berry Road

Site grading and construction of single family home within a riverfront area.

Notice of Intent

Institute Associates of Lowell, INC

31 Kirk St.

Lowell, MA 01852

Project Location: 34-4 Berry Road

Site grading and construction of single family home within a riverfront area.

Notice of Intent

Institute Associates of Lowell, INC
31 Kirk St.
Lowell, MA 01852

Project Location: 34-5 Berry Road

Site grading and construction of single family home within a riverfront area.

The following individuals spoke on behalf of the applicant:

M. Hamor – Engineer.
D. Jenkins – Applicant Representative

The engineer described the project as consisting of a roadway expansion and improvement and the construction of 4 single family homes is located off Berry Road. An existing two-story brick building will remain, porous pavement will be used and the Planning Board has approved the project. The engineer displayed a plan showing all four lots. C. Zacherer noted that the Commission members had not received copies of that plan. He explained to the applicant that the Commission needs to have all plans for review 7 days prior to the meeting. The engineer explained that the entire plan set had been filed with DEP and that he would be happy to provide the plan showing all four lots to the Commission. C. Zacherer stated that the public hearing would have to be continued.

Mr. Jenkins made a motion to demolish the building to prepare for the grand opening of the substance abuse building. The owner would like to remove trailers before the grand opening. Staked out erosion control has been installed and was inspected that day by DPD. All demolished material will be placed on the existing roadway and the area will be re-graded. The Commission did not have any issues with that plan.

L. Varnum made a motion and K. Biedron seconded the motion to continue the public hearing. The motion passed unanimously (5 – 0).

Minutes for Approval

None

OTHER BUSINESS

Notices

None

ADJOURNMENT-

Diane N. Tradd
Assistant City Manager/Director

Eric Slagle
Director of Development Services

Shaun Shanahan
Building Commissioner

MEMORANDUM

DATE: October 22, 2015

TO: Diane Tradd, DPD Director

CC: Eric Slagle, Development Services Director
Shaun Shanahan, Building Commissioner
Swaathi Joseph, Assistant Planner
Judith Tymon, Senior Planner
Christopher McWhite, Building Inspector/Plans Examiner

FROM: Judy Tymon, Senior Planner

RE: September 23, 2015 Conservation Commission Meeting – Meeting Minutes

A quorum of Commissioners was present. C. Beidron arrived 7:15.

Notice of Intent

Charles Beauchesnes
113 Forest St.
Lowell, MA 01851

Project Location: 902 Varnum Ave..

Raze an existing dwelling unit and replace with pre-fabricated single family home with associated utilities and driveway on a parcel with a portion located within the 100 year floodplain.

The following individuals offered comments relative to the project:

B. Hamil – engineer.

Discussion:

At last meeting the Commission questioned the cut and fill required for the project due to its location in the flood plain. The engineer presented a revised plan showing a cross-section of the disturbed area. The Commission requested that an as-built be provided at the completion of the project. The Commission also asked if the excess fill would be removed and the engineer responded that it would be removed.

Motion:

L. Varnum made a motion and KD seconded the motion to close the public hearing.

WL to add amendment KD –

W. Lovely made a motion to issue the Order of Conditions with conditions and L.Varnum seconded the motion. The motion passed unanimously (7 – 0).

Condition: Disturbed area will be loam and seeded.

Notice of Intent – DEP 206-0748

Institute Associates of Lowell, INC
31 Kirk St.
Lowell, MA 01852

Project Location: 34-2 Berry Road

Site grading and construction of single family home within a riverfront area.

Notice of Intent – DEP 206-0747

Institute Associates of Lowell, INC
31 Kirk St.
Lowell, MA 01852

Project Location: 34-3 Berry Road

Site grading and construction of single family home within a riverfront area.

The following individuals spoke on behalf of the applicant:

M. Hamor – engineer.

D. Jenkins – representative for the applicant

Discussion:

At the site walk on September 23, 2015 the Commission members recommended enlarging the restoration area and to require a 10 ft. restoration zone, with permanent markers on 3 posts to mark the restoration area. 3 posts on each property. Test borings have been performed and groundwater has not been observed. Sandy soils have been observed. The City will be accepting the roadway. The restoration area will be planted with a Wild-flower hydro-seed mix.

Motion:

DEP 206 - 0748

W. Lovely made a motion and L. Varnum seconded to close the public hearing for DEP 206-0748. The motion passed unanimously (7 – 0).The

W. Lovely made a motion and L. Varnum seconded to approve the Order of Conditions for DEP 206-0748. The motion passed unanimously (7 – 0).

Motion:

DEP 206 - 0747

W. Lovely made a motion and L. Varnum seconded to close the public hearing for DEP 206-0747. The motion passed unanimously (7 – 0).The

W. Lovely made a motion and L. Varnum seconded to approve the Order of Conditions for DEP 206-0747. The motion passed unanimously (7 – 0).

Notice of Intent

Institute Associates of Lowell, INC
31 Kirk St.
Lowell, MA 01852

Project Location: 34-4 Berry Road

Site grading and construction of single family home within a riverfront area.

Motion

K. Biedron made a motion and W. Lovely seconded to continue the public hearing for Project Location 34-4 Berry Road to October 14. The motion was unanimous (7 – 0).

Notice of Intent

Institute Associates of Lowell, INC

31 Kirk St.

Lowell, MA 01852

Project Location: 34-5 Berry Road

Site grading and construction of single family home within a riverfront area.

Motion:

G. McDonough made a motion and W. Lovely seconded the motion to continue the public hearing for Project Location 34-5 Berry Road to October 14. The motion was unanimous (7 – 0).

Certificate of Compliance

Myani Realty LLC

Susan St. Hilaire

45 Province St.

Boston, MA

DEP #: 206-0364

Project Location: 1700 Middlesex St.

The following individuals spoke on behalf of the applicant:

Ron Close – engineer.

The following individuals offered comments relative to the project:

Discussion

Mr. Close prepared the site plan and shot the elevation and told the Commission that the work had been completed in July. The site visit was conducted on Sept 23. The Commission remarked that the retention basin looks to be functioning very well and that it is one of the best maintained structure they have seen.

Motion:

L. Varnum made a motion and W. Lovely seconded to issue a standard Certificate of Compliance. The motion passed unanimously (7 – 0).

Enforcement Order

Flago Realty

PO Box 2142

Lowell, MA 01851

Violation Location: 423 Pawtucket St.

Construction without a permit within bordering lands subject to flooding, riverfront and wetland buffer, in violation of the Wetlands Protection Act (310 CMR 10) and the Lowell Wetlands Ordinance (City Code of Ordinances Ch.280)

The Commission received a copy of the LOMA that had been filed electronically. They decided to table any action until a response is received regarding the LOMA.

OTHER BUSINESS

Discussion

Kazanjian Enterprises

755 Dutton St.

Lowell, MA

Location: 150 Wood St.

Dep #206-0719

Project Under construction – enforcement of OOC.

A. Kazanjian – applicant was present to discuss the site conditions. Commission Varnum has seen loam eroding down the slope, with no evidence of a silt fence. She expressed concern about the trees and reminded the applicant that he had agreed to replace maple trees. Trees are supposed to hold the slope. There was a lot of trash next to oldest house in Lowell. Most of trash was removed.

AK – are going to seed the slope. He thinks it is a good idea to seed the slope. LV – the loam is around the base of trees and trees will die. He will stabilize it. Requires work. Silt fence is there. The slope is steeper and needs stabilization. Soil is falling down the slope.

W. Lovely remarked that the site needs to be stabilized with either rip-rap or erosion control blankets. The applicant needs to work with his contractor to decide the best method to stabilize the slope. stabilize it.

The applicant agreed to stabilize the slope. DPD will monitor the site.

Minutes for Approval

None

ADJOURNMENT



WPA Form 5 – Order of Conditions

A. General Information (cont.)

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):

Middlesex North

a. County

1852

c. Book

b. Certificate Number (if registered land)

384

d. Page

7. Dates: 8/17/2015 9/23/2015 9/28/2015
a. Date Notice of Intent Filed b. Date Public Hearing Closed c. Date of Issuance

8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):

Site Plan 902 Varnum Ave

a. Plan Title

H-Star Engineering, Inc.

b. Prepared By

9/11/2015

d. Final Revision Date

Bernard Hamill

c. Signed and Stamped by

1"=20'

e. Scale

f. Additional Plan or Document Title

g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

- a. Public Water Supply b. Land Containing Shellfish c. Prevention of Pollution
d. Private Water Supply e. Fisheries f. Protection of Wildlife Habitat
g. Groundwater Supply h. Storm Damage Prevention i. Flood Control

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

- a. the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.



WPA Form 5 – Order of Conditions

B. Findings (cont.)

Denied because:

- b. the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**
- c. the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**
- 3. Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1)(a) _____ a. linear feet

Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. <input type="checkbox"/> Bank	_____ a. linear feet	_____ b. linear feet	_____ c. linear feet	_____ d. linear feet
5. <input type="checkbox"/> Bordering Vegetated Wetland	_____ a. square feet	_____ b. square feet	_____ c. square feet	_____ d. square feet
6. <input type="checkbox"/> Land Under Waterbodies and Waterways	_____ a. square feet	_____ b. square feet	_____ c. square feet	_____ d. square feet
7. <input checked="" type="checkbox"/> Bordering Land Subject to Flooding	_____ e. c/y dredged	_____ f. c/y dredged		
	4500	4500		
	_____ a. square feet	_____ b. square feet	_____ c. square feet	_____ d. square feet
Cubic Feet Flood Storage	4	100		
	_____ e. cubic feet	_____ f. cubic feet	_____ g. cubic feet	_____ h. cubic feet
8. <input type="checkbox"/> Isolated Land Subject to Flooding	_____ a. square feet	_____ b. square feet		
Cubic Feet Flood Storage	_____ c. cubic feet	_____ d. cubic feet	_____ e. cubic feet	_____ f. cubic feet
9. <input type="checkbox"/> Riverfront Area	_____ a. total sq. feet	_____ b. total sq. feet		
Sq ft within 100 ft	_____ c. square feet	_____ d. square feet	_____ e. square feet	_____ f. square feet
Sq ft between 100-200 ft	_____ g. square feet	_____ h. square feet	_____ i. square feet	_____ j. square feet



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
 206-0749
 MassDEP File # _____
 eDEP Transaction # _____
 City/Town _____

B. Findings (cont.)

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. <input type="checkbox"/> Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. <input type="checkbox"/> Land Under the Ocean	_____	_____		
	a. square feet	b. square feet		
	_____	_____		
	c. c/y dredged	d. c/y dredged		
12. <input type="checkbox"/> Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. <input type="checkbox"/> Coastal Beaches	_____	_____	_____	_____
	a. square feet	b. square feet	c. nourishment	d. nourishment
14. <input type="checkbox"/> Coastal Dunes	_____	_____	_____	_____
	a. square feet	b. square feet	c. nourishment	d. nourishment
15. <input type="checkbox"/> Coastal Banks	_____	_____		
	a. linear feet	b. linear feet		
16. <input type="checkbox"/> Rocky Intertidal Shores	_____	_____		
	a. square feet	b. square feet		
17. <input type="checkbox"/> Salt Marshes	_____	_____	_____	_____
	a. square feet	b. square feet	c. square feet	d. square feet
18. <input type="checkbox"/> Land Under Salt Ponds	_____	_____		
	a. square feet	b. square feet		
	_____	_____		
	c. c/y dredged	d. c/y dredged		
19. <input type="checkbox"/> Land Containing Shellfish	_____	_____	_____	_____
	a. square feet	b. square feet	c. square feet	d. square feet
20. <input type="checkbox"/> Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	_____	_____		
	a. c/y dredged	b. c/y dredged		
21. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	_____	_____		
	a. square feet	b. square feet		
22. <input type="checkbox"/> Riverfront Area	_____	_____		
	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	_____	_____	_____	_____
	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	_____	_____	_____	_____
	g. square feet	h. square feet	i. square feet	j. square feet



B. Findings (cont.)

* #23. If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

23. Restoration/Enhancement *:

a. square feet of BVW

b. square feet of salt marsh

24. Stream Crossing(s):

a. number of new stream crossings

b. number of replacement stream crossings

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
 - a. The work is a maintenance dredging project as provided for in the Act; or
 - b. The time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
 - c. If the work is for a Test Project, this Order of Conditions shall be valid for no more than one year.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order. An Order of Conditions for a Test Project may be extended for one additional year only upon written application by the applicant, subject to the provisions of 310 CMR 10.05(11)(f).
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on 9/28/2015 unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.



C. General Conditions Under Massachusetts Wetlands Protection Act

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.
9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.
10. A sign shall be displayed at the site not less than two square feet or more than three square feet in size bearing the words,

"Massachusetts Department of Environmental Protection" [or, "MassDEP"]
"File Number 206-0749 "
11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.
12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.
13. The work shall conform to the plans and special conditions referenced in this order.
14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.
15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.
16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.



C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.
18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.
19. The work associated with this Order (the "Project")
- (1) is subject to the Massachusetts Stormwater Standards
- (2) is NOT subject to the Massachusetts Stormwater Standards

If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:

- a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.
- b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
- i.* all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
 - ii.* as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
 - iii.* any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;



C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;

v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement") for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:

i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and

ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.



WPA Form 5 – Order of Conditions

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

- g) The responsible party shall:
 1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
 2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
 3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.
- h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.
- i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.
- j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.
- k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.
- l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

Please see attached "Standard Lowell Order of Conditions"

- 20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.



WPA Form 5 – Order of Conditions

D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? Yes No
2. The _____ hereby finds (check one that applies):

Conservation Commission

- a. that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

1. Municipal Ordinance or Bylaw

2. Citation

Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

- b. that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

1. Municipal Ordinance or Bylaw

2. Citation

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.

The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
 206-0749
 MassDEP File # _____
 eDEP Transaction # _____
 City/Town _____

E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

1. Date of Issuance _____

Please indicate the number of members who will sign this form.

This Order must be signed by a majority of the Conservation Commission.

2. Number of Signers _____

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures:

by hand delivery on _____

by certified mail, return receipt requested, on _____

Date _____

Date 9/28/15
7011 0470 0002 3327 1277

F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
 206-0749
 MassDEP File # _____
 eDEP Transaction # _____
 City/Town _____

G. Recording Information

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

 Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

 Conservation Commission

Please be advised that the Order of Conditions for the Project at:

 Project Location

 MassDEP File Number

Has been recorded at the Registry of Deeds of:

 County

 Book

 Page

for: _____
 Property Owner

and has been noted in the chain of title of the affected property in:

 Book

 Page

In accordance with the Order of Conditions issued on:

 Date

If recorded land, the instrument number identifying this transaction is:

 Instrument Number

If registered land, the document number identifying this transaction is:

 Document Number

 Signature of Applicant



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

DEP File Number:

**Request for Departmental Action Fee
Transmittal Form**

Provided by DEP

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. Request Information

1. Location of Project

a. Street Address

b. City/Town, Zip

c. Check number

d. Fee amount

2. Person or party making request (if appropriate, name the citizen group's representative):

Name

Mailing Address

City/Town

State

Zip Code

Phone Number

Fax Number (if applicable)

3. Applicant (as shown on Determination of Applicability (Form 2), Order of Resource Area Delineation (Form 4B), Order of Conditions (Form 5), Restoration Order of Conditions (Form 5A), or Notice of Non-Significance (Form 6)):

Name

Mailing Address

City/Town

State

Zip Code

Phone Number

Fax Number (if applicable)

4. DEP File Number:

B. Instructions

1. When the Departmental action request is for (check one):

- Superseding Order of Conditions – Fee: \$120.00 (single family house projects) or \$245 (all other projects)
- Superseding Determination of Applicability – Fee: \$120
- Superseding Order of Resource Area Delineation – Fee: \$120

Important:
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.





Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

DEP File Number:

Request for Departmental Action Fee Transmittal Form

Provided by DEP

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Instructions (cont.)

Send this form and check or money order, payable to the *Commonwealth of Massachusetts*, to:

Department of Environmental Protection
Box 4062
Boston, MA 02211

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.
3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see <http://www.mass.gov/eea/agencies/massdep/about/contacts/>).
4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.



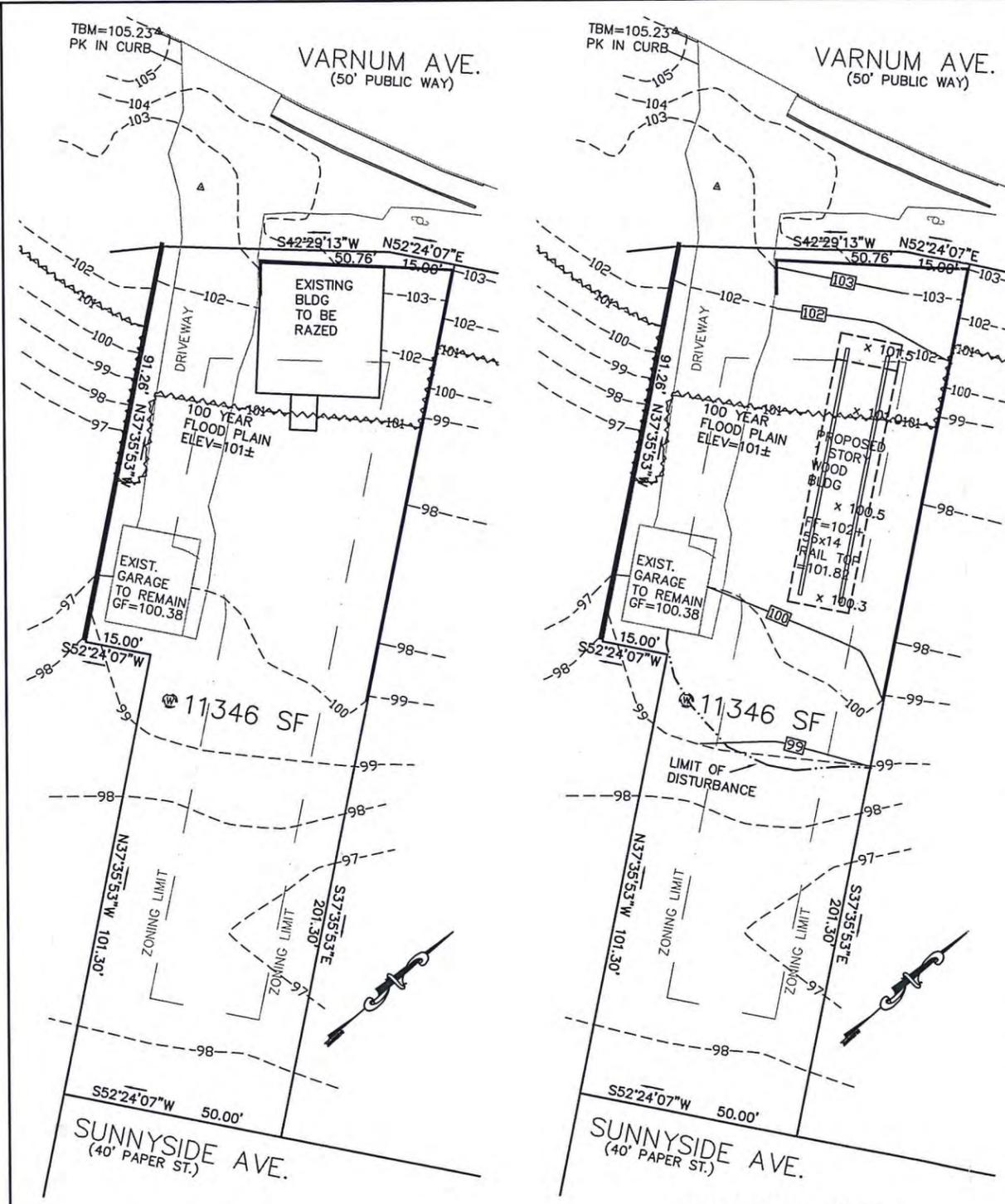








SITE PLAN 902 VARNUM AVE. LOWELL, MA



- LEGEND**
- MONUMENT FOUND
 - ⊗ PROPOSED TREE
 - ⊕ EXISTING FIRE HYDRANT
 - EXISTING WALL
 - ⊠ TEST HOLE
 - ⊙ LIGHT POST
 - ⊕ FLOOD LIGHT
 - ⊕ STONEWALL
 - ⊕ UTILITY POLE
 - ⊕ WATER VALVE
 - ⊕ 100 YR FLOOD PLAIN
 - SIGN
 - WATERLINE
 - ⊕ CATCHBASIN
 - SEWER MANHOLE
 - SEWER LINE
 - OVERHEAD ELECTRIC
 - UNDERGROUND ELECTRIC
 - GAS LINE
 - DRAINLINE
 - ⊕ DRAINAGE MANHOLE
 - ⊕ ELECTRIC MANHOLE
 - ⊕ ELECTRIC BOX
 - EXISTING CONTOUR
 - PROPOSED CONTOUR
 - FENCE
 - LIMIT OF DISTURBANCE
 - WATER QUALITY INLET
 - CONCRETE WALL
 - ⊕ PROPOSED STREET LIGHT
 - TREE/BRUSH LINE
 - SILTATION FENCE
 - x 100.5 FINISH SPOT GRADE



ZONING DISTRICT: SSF
REFERENCE:
 SUBJECT TO EASEMENTS AND/OR RESTRICTIONS AS SHOWN AND/OR RECORDED.
 SEE PLAN BOOK 42 PLAN 43 MNRD.
 SEE PLAN BOOK 70 PLAN 25 MNRD.
 SEE PLAN BOOK 203 PLAN 82 MNRD.
 SEE PLAN BOOK 125 PLAN 174 MNRD.
 SEE DEED BOOK 1852 PAGE 3 MNRD.
 SEE ASSESSORS MAP 0031 PARCEL 5880-0902
 SEE FLOOD MAP 25017C0138E DATED 10 JUNE 2010.

NOTE:
 BUILDING LOCATION AND OFFSETS SHOWN ARE SPECIFICALLY FOR ZONING DETERMINATION ONLY AND NOT TO BE USED TO ESTABLISH PROPERTY LINES.

CERTIFICATION:
 PLAN WAS COMPILED FROM EXISTING PLANS IN ACCORDANCE WITH THE TECHNICAL STANDARDS FOR FOUNDATION INSPECTIONS AS ADOPTED BY THE MASSACHUSETTS ASSOCIATION OF LAND SURVEYORS AND CIVIL ENGINEERS.
 A. THE BUILDING CONFORMS TO THE DIMENSIONAL REQUIREMENTS OF THE ZONING BYLAWS OF THE CITY OF LOWELL, MA. LOT IS "GRANDFATHERED".
 B. THE BUILDING IS IN A SPECIAL FLOOD HAZARD AREA.

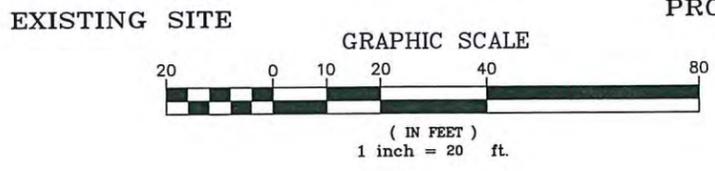
DATE: 17 AUG. 2014



Bernard H. Hamill
 BERNARD H. HAMILL

PREPARED FOR:
CHARLES BEAUCHESNE
 902 VARNUM AVE.
 LOWELL, MA

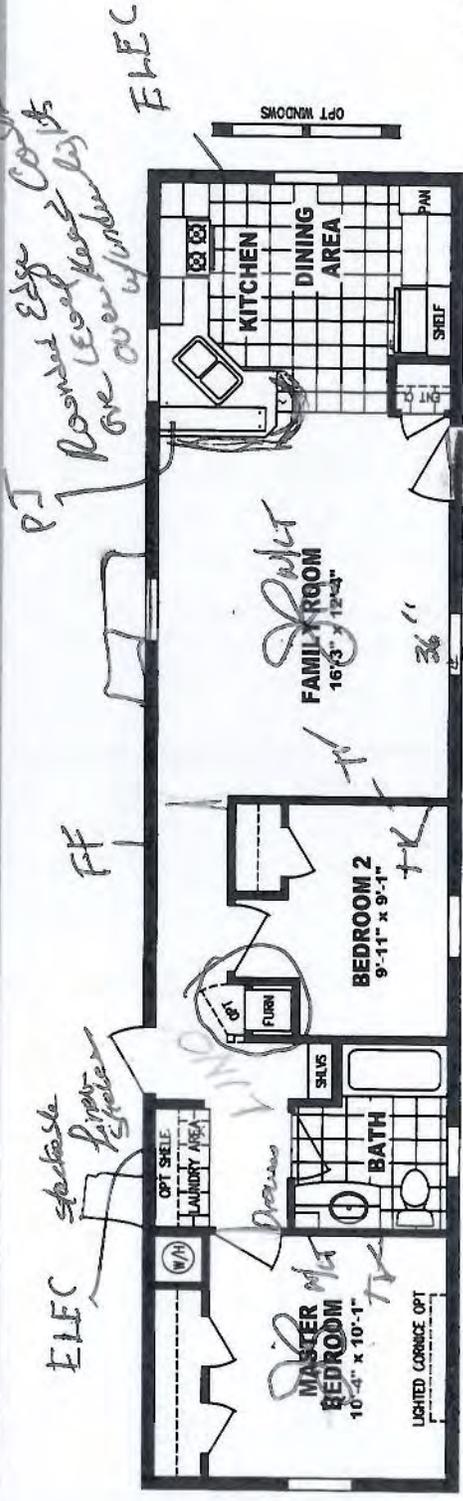
PREPARED BY:
H-STAR ENGINEERING, INC.
 200 GREENVILLE ROAD
 NEW IPSWICH, NH 03071
 (978) 973-3078
 (EMAIL: HSTAR@ATT.NET)



Smooth Ceilings T/O. 90" Vaulted in Sectionals 96" Flat in Single-Sections Can Lights in Kit/Dining area Decorative Wall Panels Accent Panel in Kitchen Accent Wall in MBR sectional home only Accent Wall in Master Bath Profile MDF Trim T/O Moxie Carpet L.R., B.R.s, Hall Tackstrip Carpet Installation 4# Rebound Carpet Pad Floor vinyl in Kit., Util., Baths 6-Panel White Interior Doors Cornice Board w/ Side Panels on L.R., D.R., & B.R. windows 1" Mini-Blinds T/O Cinnamon Glaze Flat panel MDF Cabinets T/O Interior Trim matches cabs. Hidden Adj. Cab Door hinges Citi-Scape Kit, O.H. Cabinets Adjustable Shelf in O.H. Cabs	Fully Lined Cabinets Bottom Shelf in Base Cabinet Full Center Shelf in Base Cabs Brushed Nickel Cabinet Pulls Bank of Drawers in Kitchen Accent Cornice over Range Accent Cornice-Kit, Window 33x19x7 SS Kitchen Sunk CFG Dual Cntrl Vanity Faucet Empire-high-Rise Kit, Faucet Fire Extinguisher under sink Sq. Edge Laminate Ctps. T/O Laminate Backsplash T/O 18 FF Refr. with Ice Tray 30" Elyse Range GAS 30" Range Hood w/Light Ceramic Range Backsplash 30 Gal. Elec. W/H with pan Auto Ignition Gas Furnace In-line Formed Aluminum Heat Ducts & Registers Ventilare Air Exchange Dual-Control Thermostat Fiberglass Tub/Showers	Temp. Bat. Tub/Shwr control 35" High Bath Vanity Cabs. Framed Vanity Mirror Furniture-Style Vanities T/O Acrylic Vanity box(es) w/stop 1.6 Gal. Round Bowl Stool(s) Whole-House Water Shut-off Plumb, Wire, Vent for W/D PEX Water Supply Lines Power Bath Vent each bath 6 Cubbies over stool - hall bath Ceiling light in each bedroom Wire Vented Shelf in Closets Lighted Cornice on MBR wall sectional homes only Smoke Detector in each BR Exterior GFI Receptacle 200 Amp Electrical Service Toggle Light Switches 1/0 Light at Each Exterior Door R-30 Blown-In Ceiling Insul. R-11 Fiberglass Floor Insul. R-19 Exterior Wall Insulation 2 x 6 Exterior Walls @ 16"OC	2 x 6 Floor Joists @ 16" O.C. 5/8" OSB T&G Floor Decking 2B# Roof Trusses @ 24" O.C. Fiberglass 3-tab Shingles Shingle-Over Ridge Vent Iceguard applied at eaves 12" Gable Overhang on Roof 6" Eave Overhang-28" Wide 10" Eave Overhang-24" Wide 36" Fibrgls 6-Panel Front Door 32" Cottage Rear Door Keyed-Alike Lock Sets Deadbolt Lock on F&R Doors Vinyl Dual Glazed Windows - Low-e glass non-gridded D-4 Dutchlap Vinyl Siding Thermal Sheathing -Sidelwalls 7/16" OSB w/wind wrap on gable end walls Raised Panel Shutters on: Front door side-Sectional Hitch end only-Singlewide Removable Hitch
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6014-1631-1

14 x 56 // 747 sq ft // 2 bedrooms 1 bath

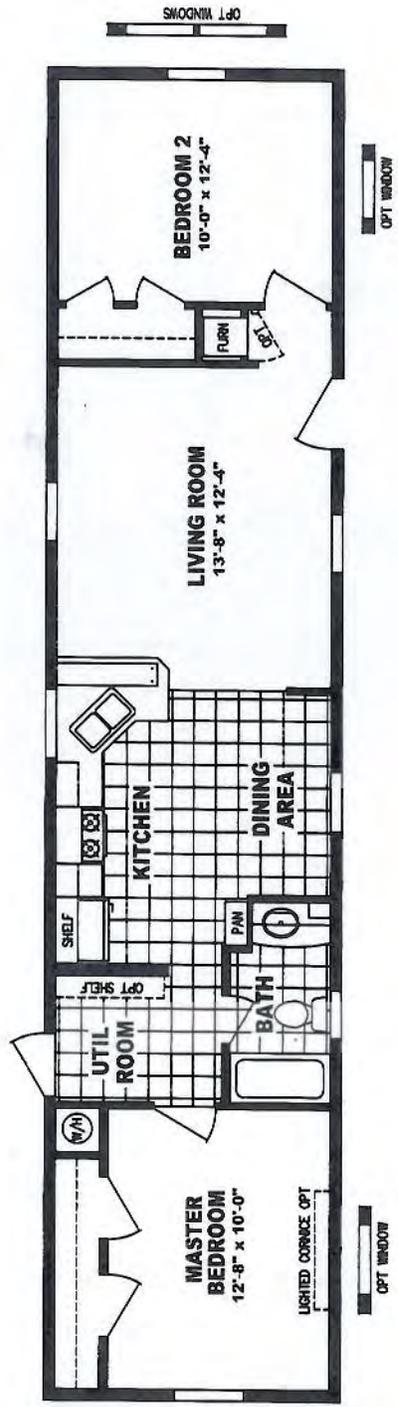


OPTIONAL 6' PORCH
(optional door required to access porch)

STORM DOORS FF + BALK

6414-1525-1

14 x 60 // 800 sq ft // 2 bedrooms 1 bath



3/4 BATH



Marlette[®]

**INSTALLATION
MANUAL**

10/15



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About Marlette Homes

Focused primarily in the northwestern and northeastern US, Marlette has built affordable, innovative and energy-efficient manufactured homes and modular homes for over 40 years. With Marlette's industry-leading innovations such as engineered foundation systems, forced-air heating and reliable plumbing systems, it did not take long for a pioneering reputation to set its homes apart from the competition. Company history inspires pride in its team members and is expressed not only in the quality homes built, but also in their longevity of service. A majority of retail outlets are long-term partners and have contributed greatly to establishing Marlette as a home "Designed for Living. Built for Life."

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Using the Manual

This manual is organized into a series of steps that will take you through the entire installation process using only those pages required for the specific home being installed. First, review the entire manual, including the Introduction chapter. As you read it, identify sections of the manual that you will need; identify other documents or information you will need; construct lists of tools and materials required for your particular installation; and make sure you have everything you need before starting work.

After reviewing the entire manual, refer to the sequence of installation steps in the table below. Identify the pathway for your installation and follow the arrows downward. Select either **Single Section Home** or a **Multi-Section Home** and choose the column corresponding to the home's foundation type, either **Pier and Ground Anchor** or **Load-Bearing Perimeter Wall** (see **Definitions**, p. 6). Then complete the work in each of the sections starting with **Getting Started**.

If using an alternative (proprietary) foundation system, the installation process will change from that described in this manual. Consult the system manufacturer's directions for instructions. See page 8 for alternative foundation system criteria.

SINGLE SECTION HOME		MULTI-SECTION HOME	
Pier and Ground Anchor	Load-Bearing Perimeter Wall	Pier and Ground Anchor	Load-Bearing Perimeter Wall
Getting Started (p. 10) ▼			
Prepare the Site (p. 15) ▼			
Install Footings (p. 20) ▼	Construct Foundation (p. 35) ▼	Install Footings (p. 20) ▼	Construct Foundation (p. 35) ▼
Set the Home (p. 38) ▼	Connect Utilities (p. 95) ▼	Set the Home (p. 38) ▼	Complete Multi-Section Set (p. 44) ▼
Install Stabilizing System (p. 74) ▼	Prepare Appliances and Equipment (p. 103) ▼	Complete Multi-Section Set (p. 44) ▼	Complete Roof and Exterior Walls (p. 56) ▼
Connect Utilities (p. 95) ▼	Complete Under the Home and Site built Structures (p. 112) ▼	Complete Roof and Exterior Walls (p. 56) ▼	Connect Crossovers (p. 61) ▼
Prepare Appliances and Equipment (p. 103) ▼	Prepare Home for Occupancy (p. 115) ▼	Connect Crossovers (p. 61) ▼	Complete Interior (p. 72) ▼
Complete Under the Home and Site built Structures (p. 112) ▼	Complete Installation Checklist (p. 116)	Complete Interior (p. 72) ▼	Connect Utilities (p. 95) ▼
Prepare Home for Occupancy (p. 115) ▼		Install Stabilizing System (p. 74) ▼	Prepare Appliances and Equipment (p. 103) ▼
Complete Installation Checklist (p. 116)		Connect Utilities (p. 95) ▼	Complete Under the Home and Site built Structures (p. 112) ▼
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APPROVED Revised **APPROVED**
 JULY 24 2015
 Federal Manufactured
 Home Construction
 And Safety Standards

Getting Started

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Please refer to Appendix for any plant specific details that may supplement or supercede information listed in the following installation manual.

The following is a list of revisions to this installation manual since the June 2014 version:

Page 4 - removed Appendix A

Page 6 - added definition of Concrete Anchor

Page 7 - adjusted list of definitions due to revision of page 6

Page 8 - Engineer's Stamp section move from page 7 and reference to Appendix A was removed

Page 19 - added reference to concrete anchors

Pages 22 & 23 - added mating line spans up to 48 feet

Page 35 - reference to Appendix A was removed

Pages 41 & 42 - added "when required" to shim descriptions

Page 68 - revised Heat Tape receptacle description to state it is protected by a GFCI outlet

Page 74 - removed statement referencing anchors installed in concrete

Page 75 - reference to Appendix A was removed

Pages 78 - 81 - added note at bottom of page referencing additional strap when " * " is noted

Page 113 - revised name of Step 3

Page 114 - revised 5 psf to 8 psf

Page 115 - removed "approved by the manufacturer"

Page 116 - revised skirting installation checklist item

Addendum - removed Appendix A

Introduction

This installation manual contains instructions that must be followed for the proper installation of the home. It complies with the HUD Installation Standards. Please read all instructions and any other documents (including addendum pages and supplements) that may apply to the specific home prior to commencing site work or installation.

This installation manual covers permits and site work through final inspection of the installation. It covers both single and multi-section homes installed over pier and anchor and load bearing crawl space walls. It contains instructions, including specifications and procedures, for the set and hookup of homes to be used as single-family dwellings.

The importance of correct installation cannot be over-emphasized. Correct installation is absolutely essential to homeowner satisfaction and the structural integrity of the home. All instructions must be followed to provide the customer with a safe, quality home.

No manual can cover all circumstances that may exist for certain home designs or building sites. For questions, further clarification or if you encounter conditions at the site or in the design of the home or its foundation not covered by this manual, please contact the manufacturer, a registered engineer or registered architect.

Supplemental addendum pages may be included with this manual. Supplements include requirements not covered in this manual or that supersede the manual instructions.

Once the home installation is complete, leave this manual with the home.

IMPORTANT NOTICES

- The home manufacturer is not responsible for installation or for the materials supplied by the set-up crew at the time of installation. The installer may be responsible for any deviations from the installation instructions of this manual.
- To keep the home in compliance with its warranty, the home installation must follow the procedures described in this manual or other procedures approved by the manufacturer. Deviation from the instructions in this manual may void the home's warranty. Any alterations or changes to the home shall be approved by a registered engineer or registered architect and may still be subject to warranty violations.
- When an installer does not provide support and anchorage in accordance with the approved manufacturer's installation instructions, or encounters site conditions (such as areas that are subject to flood damage or high seismic risk) or other conditions that prevent the use of the instructions provided in this manual, the installer must obtain special site-specific instructions from the manufacturer or use a design approved by a registered engineer or registered architect. Designs provided by registered professional engineers or registered architects must also be approved by the manufacturer and DAPIA. Alternative support and anchorage designs may be used which are state approved and acceptable to the local authority having jurisdiction.

SAFETY

There are potential hazards associated with the installation of a manufactured home. Home installers are licensed and, as experienced professionals, should recognize these hazards, be qualified to work with them, and be capable of providing safe work practices and equipment that minimize the risks of injury.

Only qualified persons should install a manufactured home. The installer must possess a valid installation license as a manufactured home installer. As qualified professionals in the field of home installation, installers are the experts and must be aware of the hazards and conditions faced. Warnings are published throughout this manual as reminders. These reminders may not cover all hazards, all potential hazards, or all possible consequences of improper or unsafe installation practices.

Construction crews should be trained in the skills required and be supervised by experienced personnel. Installers should regularly inspect work preformed by crews and subcontractors.

Obey OSHA regulations, particularly those related to home construction, such as Title 29 Code of Regulations Part 1926. For copies of OSHA regulations, call (202) 512-1800 or visit www.osha.gov on the web.

RESOURCES

Office of Regulatory Affairs and Manufactured Housing

US Department of Housing and Urban Development
451 Seventh Street, SW, Room 9164
Washington, DC 20410-8000
Telephone: (202) 708-6423 or (800) 927-2891
FAX: (202) 708-4213

State Administrative Agencies

A list of SAAs may be found on the web at www.hud.gov/offices/hsg/sfh/mhs/mhssaa.cfm or by contacting the Office of Regulatory Affairs and Manufactured Housing or in the Homeowners Manual.

FEDERAL PREEMPTION

This home was engineered, constructed and inspected in conformance with the Federal Manufactured Home Construction and Safety Standards of the US Department of Housing and Urban Development (24 CFR Part 3280, commonly referred to as the "HUD Code") in effect on the date of construction. These Standards set forth minimum requirements for the design and construction of manufactured homes designed to be used as dwellings.

Individual states, counties and cities shall have no authority to establish standards regarding the construction or safety of a manufactured home. A metal certification label is affixed to each section of the home to certify that it has been constructed and inspected to comply with these Standards. The design plans and in-plant construction of all homes are inspected by independent third party agencies to assure compliance with the Standards.

The installation of the home and any alterations made to the home shall conform to the requirements of the Federal Manufactured Home Construction and Safety Standards and the HUD Model Manufactured Home Installation Standards. These installation instructions are minimum requirements. Applicable local or state laws may have more stringent installation requirements than outlined in this manual and must be followed. Consult with the local authority having jurisdiction (LAHJ) for regulations that may require licenses and/or permits or which may affect procedures described in this manual.

DEFINITIONS

ANCHOR ASSEMBLY. Any device or other means designed to transfer home anchoring loads to the ground.

ANCHORING EQUIPMENT. Ties, straps, cables, turnbuckles, chains, and other approved components, including tensioning devices that are used to secure a home to anchor assemblies.

ANCHORING SYSTEM. A combination of anchoring equipment and anchor assemblies that will, when properly designed and installed, resist the uplift, overturning, and lateral forces on the home.

BASEMENT. A load bearing perimeter wall foundation that includes habitable space (finished or unfinished, heated or unheated) completely or partially below grade.

CONCRETE ANCHOR. A specific anchoring assembly device designed to transfer home anchoring tension loads from straps to concrete foundation or slab system.

CRAWLSPACE. The space underneath the home's floor system, enclosed with either load- or non-load bearing perimeter walls. The ground may be covered with a concrete slab or by a plastic ground cover. Crawlspace walls must be vented and an access must be provided.

CROSSOVERS. Utility interconnections between sections of multi-section homes, including heating and cooling ducts, electrical circuits, and water pipes, drain plumbing, and gas lines.

DATA PLATE. An information sheet located on a cabinet door under the kitchen sink or on a wall panel or door face near the electrical panel, utility room or in the master bedroom closet. It contains a unique identification number and identifies the wind zone, roof load zone, and climatic zone for which the home was constructed.

DIAGONAL TIE. A tie intended to resist horizontal or shear forces, but which may resist vertical, uplift, and overturning forces.

FOOTING. That portion of the support system that transmits loads directly to the soil.

GROUND ANCHOR. A specific anchoring assembly device designed to transfer home loads to the ground.

H-BEAM. Steel H-beams, also called cross beams, are often used to support a home over a basement or crawlspace. They span across the foundation from sidewall to sidewall, typically with an intermediate support pier and footing (typically in the center point resulting in a line of piers under the centerline of a double section home).

INFORMATION PACKET. A set of important documents provided with the home including warranties, information on high wind coverage, and other features of the specific home.

INSTALLATION LICENSE. The proof that an installer meets the requirements for installing manufactured homes under the HUD-administered installation program.

LABELED. Equipment or materials to which has been attached a label, symbol, or other identifying mark of a certified testing laboratory, inspection agency, or other organization concerned with product evaluation. The label indicates compliance with nationally recognized standards or tests to determine suitable usage in a specified manner.

LISTED OR CERTIFIED. Included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

LOAD-BEARING PERIMETER WALL FOUNDATION. A support system for the home whereby the home is mechanically fastened to a structural wall(s) that transfers gravity, lateral and uplift loads to the ground.

LOCAL AUTHORITY HAVING JURISDICTION (LAHJ). The state, city, county, municipality, utility, or organization that has local responsibilities that must be complied with during the installation of a manufactured home.

MUST. Indicates a mandatory requirement.

N/A. Indicates not applicable.

PIER. That portion of the support system between the footing and the home, exclusive of shims. Types of piers include, but are not limited to: (1) manufactured steel stands; (2) pressure-treated wood; (3) manufactured concrete stands; (4) concrete blocks; and (5) portions of foundation walls.

PIER AND GROUND ANCHOR FOUNDATION. A support system for the home that employs piers under the chassis and other locations to support gravity loads and employs ground anchors and tie downs (the stabilizing system) to resist lateral and uplift loads.

PERIMETER BLOCKING. Regularly spaced piers supporting the sidewalls and marriage line of the home. Some homes require perimeter blocking in addition to supports under the home's frame.

QUALIFIED (OR LICENSED). Has the necessary knowledge and skills gained from experience and training that will allow performance of the job safely, competently, and in accordance with all applicable codes, standards, rules and regulations. Meets all necessary qualification tests including any license and certification requirements that may be in effect in the area where the home will be installed, including the requirements for installing manufactured homes under the HUD-administered installation program. The term does not incorporate a state-issued installation license or certification, except to the extent provided in this part. The term does not imply that HUD approves or recommends an installer or warrants the work of an installer, and should not be used in any way that indicates HUD approval in violation of 18 U.S.C. 709.

RAMADA. Any freestanding roof or shade structure, installed or erected over a home or any portion of the home.

SHOULD. Indicates a recommendation that is strongly advised but not mandatory.

SHALL. Indicates a mandatory requirement.

SITE FOR A HOME. A designated parcel of land designed for the accommodation of one home, its accessory buildings or structures, and accessory equipment, for the exclusive use of the occupants of the home.

SKIRTING. A weather-resistant material used to enclose the perimeter, under the living area of the home, from the bottom of the home to grade.

STABILIZING SYSTEM. All components of the anchoring and support systems, such as piers, footings, ties, anchoring equipment, ground anchors, or any other materials and methods of construction that support and secure the home to the ground.

SUPPORT SYSTEM. Pilings, columns, a combination of footings, piers, foundation walls, caps, and shims and any combination thereof that will, when properly installed, support and secure the home to the ground.

TIE. Straps, cable, or securing devices used to connect the home to anchoring assemblies.

UTILITY CONNECTION. The connection of the home to utilities that include, but are not limited to, electricity, water, sewer, gas, or fuel oil.

VERTICAL TIE. A tie intended to resist uplifting and overturning forces.

WIND ZONE. The areas designated on the Basic Wind Zone Map, as further defined in by the Manufactured Home Construction and Safety Standards

ENGINEER'S STAMP

Certain pages of this manual, display the seal of a registered engineer. Federal guidelines only require the seal from one state to be displayed, but the details herein apply to all states.

SYMBOLS USED IN THE MANUAL



This icon indicates an important warning. It is critical to heed these warnings.



This icon indicates a recommended best practice. While not required, following these practices will result in a superior installation, reducing the chance that cosmetic or durability related complaints might arise.

ABBREVIATIONS

ABS	Acrylonitrile Butadiene Styrene	max.	Maximum
ANSI	American National Standards Institute	MHCSS	Manufactured Home Construction and Safety Standards
APA	American Plywood Association	min.	Minimum
ASTM	American Society for Testing and Materials	mph	Mile(s) per hour
AWPA	American Wood Preservers Association	NEC	National Electric Code
CFM	Cubic feet per minute	NFIP	National Flood Insurance Program
CFR	Code of Federal Regulations	NFPA	National Fire Protection Association
DWV	Drain, Waste, Vent	o.c.	On center
EMT	Electrical metallic tubing	OSHA	Occupational Safety and Health Administration
FEMA	Federal Emergency Management Agency	oz	Ounce(s)
ft	Foot/feet	p.	Page
ga	Gauge	psf	Pounds per square foot
HUD	US Department of Housing and Urban Development	psi	Pounds per square inch
in	Inch(es)	SAA	State Administrative Agency
LAHJ	Local Authority Having Jurisdiction	sq ft	Square foot/feet
lb(s)	Pound(s)		

ALTERNATIVE FOUNDATION SYSTEMS

Alternative foundation systems or designs are permitted in accordance with the following:

- System designs are prepared by a registered engineer or a registered architect or tested and certified by a registered engineer or registered architect in accordance with acceptable engineering practice and are manufactured and installed so as not to take the home out of compliance with the Manufactured Home Construction and Safety Standards.
- An Alternative Foundation and/or Tiedown system design must be submitted to the manufacturer if it is not listed on the following website: www.marlettehomes.com. Click the **Builders Resource** tab at the lower right hand corner of the page to view all DAPIA approved Alternative Tiedown systems. Prior to obtaining an alternative design contact the home building facility for available approved alternative designs or instructions for submitting an alternative design.

DISPLAY AND STORAGE OF THE HOME

WEATHER PROTECTION

If the installation is not started immediately upon delivery of the home, the retailer and/or installer has the responsibility to ensure the exterior weather protection covering of marriage walls and the roof of homes has not been damaged during shipment. Inspect the home immediately upon the delivery and frequently during storage. Promptly repair tears in the home closure materials to prevent damage from the elements. Inspect and repair nail holes in roof shingles with asphalt cement or replace damaged shingles. Inspect and repair siding as needed.

SUPPORTING A HOME FOR DISPLAY

When a new home is to be displayed at a retail location, temporarily block and support the home. Set up homes with single block piers (maximum height per Table 9), metal piers or jack stands spaced no further apart than 12 feet o.c. beneath each I-beam. The tire and axle system may be used as one of these required supports, and the hitch jack may be used as another. Locate the first support no further than two feet from the rear end of the home (Figure 1). Place additional supports along the perimeter on either side of openings greater than four feet (i.e. sliding glass doors, bay windows, etc.). For 18' wide homes, perimeter supports must also be spaced no further than 12 feet o.c.

For multi section homes, locate additional supports along the marriage line under support columns. These locations will be marked by the manufacturer.

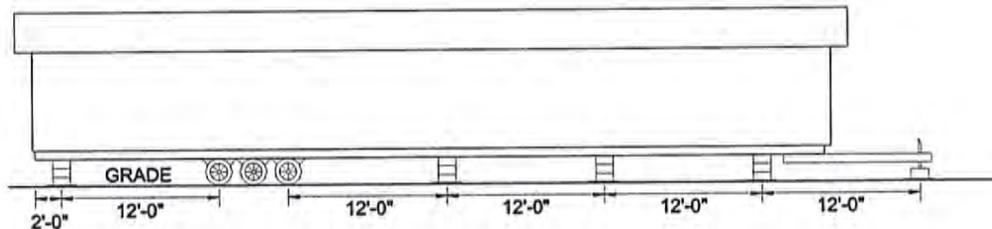


Figure 1. Supporting a home for display

For all homes, place footings below each support. Footings may be placed directly on the surface grade without excavation and may be ABS pads, 2 x 10 by 16 inch long pressure treated lumber or 16" x 16" by 4 inch thick concrete pads.

SUPPORTING A HOME FOR STORAGE

To prevent damage to homes being stored at the manufacturer's facility, model home center or the home site, but not on display (i.e. people shall not be permitted inside the home) for a period exceeding 30 days, locate supports below each I-beam no further than two feet from each end of the home and at the approximate center of the home length. For 18' wide homes, perimeter supports must also be spaced no further than 12 feet o.c.

Whether the home is being supported for display or storage the height of the home should be no higher than 48 inches as measured from the top of the ground to the bottom of the I-beam. In addition, it is extremely important that the roof/ridge vents are installed while the home is on display. Failure to install the roof/ridge vents may lead to significant damage to the roof and home.

Getting Started

This chapter covers a few steps that, taken now, will avoid problems later in the installation process.

Follow the Steps below:

- ▼ STEP 1. LOCATE THE DATA PLATE (p. 10)
- ▼ STEP 2. CONFIRM WIND ZONE (p. 10)
- ▼ STEP 3. CONFIRM THERMAL ZONE (p. 11)
- ▼ STEP 4. CONFIRM ROOF-LOAD ZONE (p. 13)
- ▼ STEP 5. CHECK LOCAL CODES AND SECURE PERMITS (p. 14)

STEP 1. LOCATE THE DATA PLATE

Locate the data plate inside the home (Figure 2), typically inside a kitchen cabinet door or on a wall panel or door face near the electrical panel, utility room or bedroom closet.



Figure 2. Sample data plate – shown as reference only, actual data plate may vary.

The information on the data plate will be used to verify that the home was designed for the proper location.

STEP 2. CONFIRM WIND ZONE

From Table 1, identify the wind zone for the home. Verify that the home conforms to the following rules and any special requirements determined by the LAHJ.

- No home may be located in a higher wind zone than that indicated on the data plate. (Example: a home designed for Wind Zone II cannot be placed in Wind Zone III.)
- A home may be located in a lower wind zone than that indicated on the data plate. (Example: a home designed for Wind Zone II can be placed in either Wind Zone II or I.) When a home is located in a lower wind zone than indicated on the data plate it may be installed per the requirements of the lower wind zone.
- Homes located within 1,500 feet of the coastline in Wind Zones II and III must be designed to withstand exposure 'D' conditions. This will be indicated on the data plate.

If the home does not conform to these rules, contact the manufacturer immediately.

TABLE 1. WIND ZONE BY LOCALITY

Wind Zone I	
All areas except those areas listed below as being within Wind Zone II or III	
Wind Zone II	
Alabama	Counties of Baldwin and Mobile
Florida	All counties except those listed below as within Wind Zone III
Georgia	Counties of Bryan, Camden, Chatham, Glynn, Liberty, McIntosh
Louisiana	Parishes of Acadia, Allen, Ascension, Assumption, Calcasieu, Cameron, East Baton Rouge, East Feliciana, Evangeline, Iberia, Iberville, Jefferson Davis, Lafayette, Livingston, Pointe Coupee, St. Helena, St. James, St. John the Baptist, St. Landry, St. Martin, St. Tammany, Tangipahoa, Vermillion, Washington, West Baton Rouge, and West Feliciana
Maine	Counties of Hancock and Washington
Massachusetts	Counties of Barnstable, Bristol, Dukes, Nantucket, and Plymouth
Mississippi	Counties of George, Hancock, Harrison, Jackson, Pearl River, and Stone
North Carolina	Counties of Beaufort, Brunswick, Camden, Chowan, Columbus, Craven, Currituck, Jones, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrrell, and Washington
South Carolina	Counties of Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, Jasper, and Williamsburg
Texas	Counties of Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kenedy, Kleberg, Matagorda, Nueces, Orange, Refugio, San Patricio, and Willacy
Virginia	Cities of Chesapeake, Norfolk, Portsmouth, Princess Anne, and Virginia Beach
Wind Zone III	
Hawaii	Entire state
Alaska	Coastal regions (as determined by the 90 mph isotach on the ANSI/ASCE 7-88 map)
Florida	Counties of Broward, Charlotte, Collier, Dade, Franklin, Gulf, Hendry, Lee, Martin, Manatee, Monroe, Palm Beach, Pinellas, and Sarasota
Louisiana	Parishes of Jefferson, La Fourche, Orleans, Plaquemines, St. Bernard, St. Charles, St. Mary, and Terrebonne
North Carolina	Counties of Carteret, Dare, and Hyde
Other	All regions of the U.S. Territories of American Samoa, Guam, Northern Mariana Islands, Puerto Rico, Trust Territory of the Pacific Islands, and the United States Virgin Islands



Figure 2A. Wind zone map

STEP 3. CONFIRM THERMAL ZONE

From **Table 2**, identify the thermal (UO) zone for the home. Verify that the home conforms to the following rules.

- No home may be located in an area with a higher thermal zone number than that indicated on the data plate. (Example: a home designed for Thermal Zone 2 cannot be placed in Thermal Zone 3.)

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- A home may be located in a lower thermal zone than that indicated on the data plate. (Example: a home designed for Thermal Zone 2 may be placed in either Thermal Zone 2 or 1.)
- In no case may a home designated for installation in the "Humid & Fringe Climate," as identified on the data plate, be located outside of this region (Table 2).

If the home does not conform to these rules, contact the manufacturer immediately.



Figure 3. Thermal (U_o) zone map

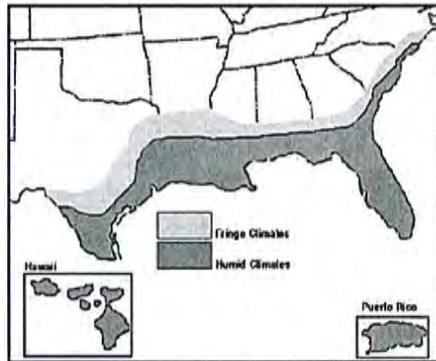


Figure 3A. Humid & fringe climate map

TABLE 2. HUMID AND FRINGE CLIMATE ZONES

Humid and Fringe Climate Zone	
Alabama	Counties of Baldwin, Barbour, Bullock, Butler, Choctaw, Clarke, Coffee, Conecuh, Covington, Crenshaw, Dale, Escambia, Geneva, Henry, Houston, Lowndes, Marengo, Mobile, Monroe, Montgomery, Pike, Washington, and Wilcox
Florida	All counties and locations
Georgia	Counties of Appling, Atkinson, Bacon, Baker, Ben Hill, Berrien, Brantley, Brooks, Bryan, Calhoun, Camden, Charlton, Chatham, Clay, Clinch, Coffee, Colquitt, Cook, Crisp, Decatur, Dougherty, Early, Echols, Effingham, Evans, Glynn, Grady, Irwin, Jeff Davis, Lanier, Lee, Liberty, Long, Lowndes, McIntosh, Miller, Mitchell, Pierce, Quitman, Randolph, Seminole, Tattnall, Terrell, Thomas, Tift, Turner, Ware, Wayne, and Worth
Hawaii	All counties and locations
Louisiana	All counties and locations
Mississippi	Counties of Adams, Amite, Claiborne, Clarke, Copiah, Covington, Forrest, Franklin, George, Greene, Hancock, Harrison, Hinds, Issaquena, Jackson, Jasper, Jefferson, Jefferson Davis, Jones, Lamar, Lawrence, Lincoln, Marion, Pearl River, Perry, Pike, Rankin, Simpson, Smith, Stone, Walthall, Warren, Wayne, and Wilkinson
North Carolina	Counties of Brunswick, Carteret, Columbus, New Hanover, Onslow, and Pender
South Carolina	Counties of Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry and Jasper
Texas	Counties of Anderson, Angelina, Aransas, Atascosa, Austin, Bastrop, Bee, Bexar, Brazoria, Brazos, Brooks, Burleson, Caldwell, Calhoun, Cameron, Camp, Cass, Chambers, Cherokee, Colorado, Comal, De Witt, Dimmit, Duval, Falls, Fayette, Fort Bend, Franklin, Freestone, Frio, Galveston, Goliad, Gonzales, Gregg, Grimes, Guadalupe,

Hardin, Harris, Harrison, Hays, Henderson, Hidalgo, Hopkins, Houston, Jackson, Jasper, Jefferson, Jim Hogg, Jim Wells, Karnes, Kaufman, Kenedy, Kinney, Kleberg, La Salle, Lavaca, Lee, Leon, Liberty, Limestone, Live Oak, Madison, Marion, Matagorda, Maverick, McMullen, Medina, Milam, Montgomery, Morris, Nacogdoches, Navarro, Newton, Nueces, Orange, Panola, Polk, Rains, Refugio, Robertson, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, Shelby, Smith, Starr, Titus, Travis, Trinity, Tyler, Upshur, Uvalde, Val Verde, Van Zandt, Victoria, Walker, Waller, Washington, Webb, Wharton, Willacy, Williamson, Wilson, Wood, Zapata, and Zavala

STEP 4. CONFIRM ROOF LOAD ZONE

From Table 3, identify the Roof Load Zone for the home. Verify that the home conforms to the following rules.

- No home may be placed in an area with a higher roof load than that indicated on the data plate. (Example: a home designed for the South (20 psf) Roof Load Zone cannot be placed in the Middle (30 psf) Roof Load Zone).
- A home may be located in an area with a lower roof load than that indicated on the data plate. (Example: a home designed for the Middle (30 psf) Roof Load Zone may be placed in the South (20 psf) Roof Load Zone). When a home is located in an area with a lower roof load than indicated on the data plate it may be installed per the requirements of the lower roof load area.
- **There are special high roof load areas (primarily in mountains) not shown on the map. Contact the LAHJ or SAA for information about these areas. The home's data plate will indicate if the home has been designed for one of these high roof load areas.**
- Ramadas may be used in areas with roof live loads greater than 40 psf. Ramadas are to be self-supporting, except that any connection to the home must be for weatherproofing only.

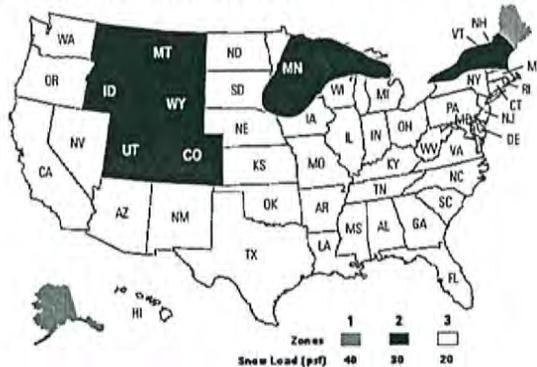


Figure 3B. Roof (snow) load map

TABLE 3. ROOF LOADS BY LOCALITY

North (40 psf roof load)	
Alaska	All counties
Maine	Counties of Aroostook, Piscataquis, Somerset, Penobscot, Waldo, Knox, Hancock, Washington
Middle (30 psf roof load)	
Colorado	All counties
Idaho	All counties
Iowa	Counties of; Buena Vista, Butler, Calhoun, Cerro Gordo, Cherokee, Chickasaw, Clay, Dickinson, Emmet, Floyd, Franklin, Hamilton, Hancock, Hardin, Howard, Humboldt, Ida, Kossuth, Lyon, Mitchell, O'Brien, Osceola, Palo Alto, Plymouth, Pocahontas, Sac, Sioux, Webster, Winnebago, Worth, Wright
Maine	Counties of Androscoggin, Cumberland, Franklin, Kanabec, Lincoln, Oxford, Sagadahoc, York
Massachusetts	County of Essex
Michigan	Counties of Alger, Alcona, Alpena, Antrim, Baraga, Benzie, Charlevoix, Cheboygan, Chippewa, Crawford, Delta, Dickson, Emmet, Gogebic, Grand Traverse, Houghton, Iron, Kalkaska, Keweenaw, Leelanau, Luce, Mackinac, Marquette, Menominee, Missaukee, Montmorency, Ogemaw, Ontonagon, Oscoda, Otsego, Presque Isle, Roscommon, Schoolcraft, Wexford
Minnesota	Counties of Aitkin, Anoka, Benton, Blue Earth, Brown, Cass, Carlton, Carver, Chippewa, Chisago, Cook, Cottonwood, Crow Wing, Dakota, Dodge, Douglas, Faribault, Fillmore, Freeborn, Goodhue, Grant, Hennepin, Hubbard, Itasca, Isanti, Jackson, Kandiyohi, Kanabec, Koochiching, Lac qui Parle, Lake, Le Sueur, Lincoln, Lyon, McLeod,

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	Meeker, Morrison, Millie Lacs, Mower, Martin, Murray, Nicollet, Nobles, Olmsted, Pipestone, Pine, Pope, Ramsey, Redwood, Renville, Rice, Rock, St. Louis, Sibley, Scott, Steele, Sherburne, Swift, Stearns, Stevens, Todd, Wade-na, Wright, Washington, Wabasha, Winona, Waseca, Watonwan, Yellow Medicine
Montana	All Counties
New Hampshire	All Counties
New York	Counties of Cayuga, Clinton, Essex, Erie, Franklin, Fulton, Genesee, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga Ontario, Orleans, Oswego, St. Lawrence, Saratoga, Schenectady, Seneca, Warren, Washington, Wayne, Wyoming, Yates
South Dakota	Counties of Brookings, Clay, Codrington, Deuel, Grant, Hamlin, Hanson, Hutchinson, Kingsbury, Lake, Lincoln, McCook, Miner, Minnehaha, Moody, Turner, Union, Yankton
Utah	All Counties
Vermont	Counties of Addison, Caledonia, Chittenden, Essex, Franklin, Grand Isle, Lamoille, Orange, Orleans, Rutland, Washington, Windsor
Wisconsin	Counties of Ashland, Bayfield, Barron, Buffalo, Burnett, Clark, Chippewa, Door, Douglas, Dunn, Eau Claire, Florence, Forest, Iron, Jackson, Langlade, Lincoln, Marathon, Marinette, Menominee, Oconto, Oneida, Pepin, Pierce, Polk, Price, Rusk, St. Croix, Sawyer, Taylor, Trempealeau, Vilas, Washburn
Wyoming	All Counties
South (20 psf roof load)	
Other	The states and counties not listed for the Middle or North roof load zone above are deemed to be within the South roof load zone.

Is the data plate present and the home placed in the appropriate wind, thermal and roof load zones?

- ▶ **YES**, go to **STEP 5, CHECK LOCAL CODES AND SECURE PERMITS**, (p. 14).
- ▶ **NO**, Stop installation activities and notify the home retailer.

STEP 5. CHECK LOCAL CODES AND SECURE PERMITS

Local regulations may set conditions for the siting and installation of a manufactured home. Consult the LAHJ, state manufactured housing association and the state SAA (See **Resources**, p. 5) for the specific local requirements, including:

- Building codes that may affect the construction of site built structures and infrastructure.
- Local requirements regulating the installation of manufactured homes.
- Setback requirements for property lines, streets, yards, and courts.
- Fire separation distances.
- Development covenants for the specific property.
- The locations of flood hazard areas and any special foundation requirements for homes installed in those areas.
- In some areas, building permits are required to install manufactured homes. Prior to making any alteration to the site and the home, contact the LAHJ to determine if plan approval and permits are required.

- ▶ go to **Prepare the Site** (p. 15)



Areas subject to flooding.

The foundation specifications contained in this manual are NOT intended to address flood loads. If the home is located in the flood plain, consult a registered engineer.

Prepare the Site

A properly prepared site is critical to a good quality installation and the long term structural stability of the home.

This chapter explains the process of planning the site, evaluating the soil, and preparing the site for construction of the home's support system.

Follow the Steps below:

- ▼ STEP 1. PLAN SITE ACCESS (p. 15)
- ▼ STEP 2. DETERMINE HOME LOCATION AND LAYOUT (p. 15)
- ▼ STEP 3. CLEAR AND GRADE THE SITE (p. 16)
- ▼ STEP 4. DETERMINE SOIL CONDITIONS (p. 16)
- ▼ STEP 5. DETERMINE SOIL BEARING CAPACITY AND FROST LINE (p. 17)
- ▼ STEP 6. DETERMINE GROUND ANCHOR HOLDING CAPACITY (p. 19)

STEP 1. PLAN SITE ACCESS

Planning the route to the site is typically the responsibility of the retailer or transportation company. Whoever is responsible must secure state permits from the states through which the home will pass.

In planning the route, avoid obstructions that might interfere with the passage of the home, such as low hanging wires and trees, low overpasses and bridges not suitable for the load. Contact the utility company if wires need to be moved. Do not allow branches, bushes or other foliage to scrape against the home as the home is moved to the site. Avoid ditches, berms, steep slopes and soft ground. Identify and fill any holes and soft spots into which the transporter's wheels may sink. Avoid moving over steep changes in grade (20 degrees or more).

If required, provide for home storage and staging areas on the site. Plan the delivery and staging of home sections and materials so that after all deliveries are complete, home sections and materials can be accessed for use and installed in the appropriate sequence. Orient home sections so they do not have to be rotated or excessively maneuvered during the installation process. Plan for temporary needs, such as dumpsters, portable toilets, crew parking, delivery vehicle drop-offs and concrete mixer deliveries.

Before moving the home to the site, inform the LAHJ and make sure the site is prepared and utilities are available.

STEP 2. DETERMINE HOME LOCATION AND LAYOUT

The home location may have already been determined by others. If not, plan the home location and layout in compliance with the regulations researched in **Getting Started, STEP 5. CHECK LOCAL CODES AND SECURE PERMITS** (p. 14). Contact utilities for locations of existing infrastructure, such as underground cables, pipes and electrical lines.

When planning the site improvements, consider the following:

- The home location should be level.
- Avoid contact with large trees, steep slopes, poorly drained areas and potential flood zones.
- Preserve trees and shrubs for shade, visual screens and windbreaks.



Site Preparation. Final responsibility for site preparation, including soil stability and frost heave control, lies with the installer. An improperly prepared site may result in the denial of a foundation-related warranty claim.



Fire separation. Comply with any LAHJ fire separation requirements or the requirements NFPA 501A, 2003 edition (Chapter 6).

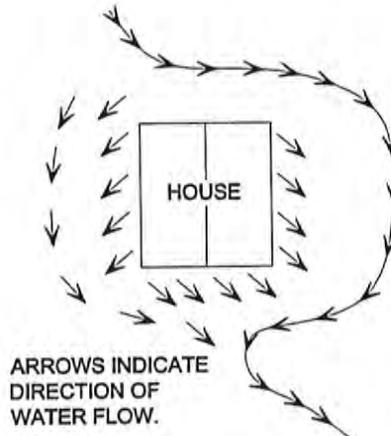
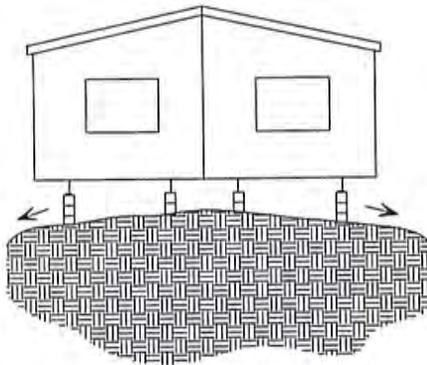
Prepare the Site

- Plan the driveway, parking areas, septic, well, other structures and utility lines.
- Consider future additions, such as screen rooms, porches and awnings.
- Site the home away from natural water paths.

STEP 3. CLEAR AND GRADE THE SITE

Trim overhanging foliage (tree limbs, etc. that could cause damage to the home) considering future growth, potential storms, swaying in wind and snow/ice-weighted branches. All organic material such as vegetation, wood, roots, twigs, dead branches, grass, brush and wood scraps must be removed in areas where footings are to be placed. Remove any debris that could become termite infested from the site and surrounding area. Properly dispose of all items.

Crown the site (**Figure 4**) away from the foundation for the first ten feet with a minimum slope of 1/2 inch per foot. Where property lines, walls, slopes or other physical conditions prohibit this slope, provide the site with drains, swales or grading to drain water away from the structure. Any fill required to grade the site should be inorganic "controlled fill" applied in a maximum of four inch layers, compacted between each layer to at least 90% of its maximum relative density. Direct runoff away from the site using ditches and berms (**Figure 5**). If the home will have skirting, start grading from two feet in from the edge of the home.



Grade the ground so that water under porches, decks and recessed entries flows away from the home. If proper grading is not possible, use other methods such as a drain tile and automatic sump pump system to remove any water that may collect under the home.

The home is suitable for the installation of gutters and downspouts. Gutters and downspouts must be installed per the gutter and downspout manufacturer's installation instructions. When gutters and downspouts are installed, direct runoff away from the home.

STEP 4. DETERMINE SOIL CONDITIONS

Examine the soil type under the proposed home location to make sure it is suitable for placement of a home. The design of the home's support system, including footing/pier spacing and size, will in part be determined by the bearing capacity of the soil and, if ground anchors are used, by the soil's withdrawal strength.

The soil under every portion of the support system must meet the following criteria:

- The soil must be firm and undisturbed (not previously excavated) or fill com-



Site drainage. Moisture under the home can result in structural damage to the floor system, foundation, anchoring system and other parts of the home. Failure to provide adequate slope/drainage can result in moisture-related problems such as mold, mildew and erosion.

Figure 4. Crown the soil under the home to prevent water ponding

Figure 5. Direct runoff away from the home



Soil. Inadequate soil bearing capacity or a support system mismatched to the soil characteristics can result in excessive or differential

pacted to at least 90% of its maximum relative density). Uncompacted fill will settle over time, causing the home to shift and become unlevel.

- Fill must not contain large debris. This too will settle over time.
- The soil must not be comprised of organic clays or peat. Organic material can decay, causing settlement and also may harbor pests that can infest the home.
- The water table must be below the lowest level of the planned support system/foundation. A soil's bearing capacity can be greatly reduced when it is saturated with water. Note that water tables may vary with seasonal or climactic conditions. Consult a geologist or the LAHJ if you are unsure of the water table level.
- The soil must not be a highly expansive type. Expansive soils can expand when they become saturated with water, causing the home to shift and become unlevel. If soils are expansive contact a registered engineer, or registered architect to assist with the design of the foundation system.

Does the soil meet these criteria?

- ▶ **YES, go to STEP 5, DETERMINE SOIL BEARING CAPACITY AND FROST LINE, (p. 17).**
- ▶ **NO, Consult a registered engineer, registered architect, or geologist to determine a suitable soil bearing capacity.**

STEP 5. DETERMINE SOIL BEARING CAPACITY AND FROST LINE

The soil under a home must be capable of withstanding the loads imposed by the weight of the home, its support system and furnishings as well as any loads imposed by wind, snow or other climactic conditions.

SOIL BEARING CAPACITY

Determine the soil bearing capacity in pounds per square foot (psf) before designing a support system. The higher the capacity (psf), the more weight the soil can hold without unduly compressing. As the soil bearing capacity increases, footings can be reduced in size or spaced farther apart.

Use one or more of the following methods to determine the site's soil bearing capacity:

- **Test the soil.** Hire a registered geologist, registered engineer, or registered architect to determine the soil classification and maximum allowable soil bearing capacity by testing the soil in accordance with generally accepted engineering practice.
- **Obtain soil records.** The local office of the U.S. Department of Agriculture's Natural Resources Conservation Service (www.soils.usda.gov) and/or the LAHJ may have test results and/or soil analyses on file for the area.
- **Conduct a pocket penetrometer test.** Use a pocket penetrometer to estimate allowable soil bearing capacity as follows:
 1. Select a location that will be under a footing.
 2. Clear a minimum area of one square foot to the depth of the bottom of the planned footing.
 3. Using the instructions provided with the pocket penetrometer, take at least five readings.
 4. Discard the high and low readings and average the remaining readings. Round this result down to the nearest soil bearing value shown in **Table 4**.
 5. Confirm that the rounded result matches the soil description in **Table 4**.
- **Determine soil bearing value by visual examination.** If one of the options above is not available, the values in **Table 4** can be used to establish soil bearing capacity by visual examination. This method provides lower capacity values than the options above. Accurate soil identification typically requires

settlement of the home, which can cause the home to become unlevel, resulting in jammed doors and windows, cracks in finishes and ruptured plumbing connections.



Soil bearing capacity. Support systems on soils with bearing capacities less than 1,000 psf must be designed by a registered engineer or registered architect and approved by the LAHJ.

Limitations of Pocket penetrometers. Pocket penetrometers do not work on sand or gravel. Use to determine allowable pressure for these types of soils. If you encounter a layer of gravel, test the soil under the gravel. Do not put the penetrometer on stones larger than its tip as this will provide an inaccurate reading.

Prepare the Site

special training or expertise. An engineer or building code official may be able to assist in classifying the soil found on the site.

TABLE 4. SOIL BEARING CAPACITY BY SOIL TYPE

Soil Classification		Soil Description	Allowable Soil Bearing Pressure (psf) ¹	Blow Count ASTM D 1586-99	Torque Probe ³ Value ⁴ (inch-pounds)
Classification Number	ASTM D 2487-00 or D 2488-00 (incorporated by reference, see 3285.4)				
1	-	Rock or hard pan	4,000+		
2	GW, GP, SW, SP, GM, SM	Sandy gravel and gravel; very dense and/or cemented sands; coarse gravel/cobbles; pre-loaded silts, clays and coral	2,000	40+	More than 550
3	GC, SC, ML, CL	Sand; silty sand; clayey sand; silty gravel; medium dense coarse sands; sandy gravel; and very stiff silt, sand clays	1,500	24-39	351-550
4A	CG, MH ²	Loose to medium dense sands; firm to stiff clays and silts; alluvial fills	1,000	18-23	276 – 350
4B	CH, MH ²	Loose sands; firm clays; alluvial fills	1,000	12-17	175-275
5	OL, OH, PT	Uncompacted fill; peat; organic clays	Refer to 3285.202(e)	0-11	Less than 175

Notes

¹ The values provided in this table have not been adjusted for overburden pressure, embedment depth, water table height or settlement problems.

² For soils classified as CH or MH, without either torque probe values or blow count test results, selected anchors must be rated for a 4B soil.

³ The torque test probe is a device for measuring the torque value of soils to assist in evaluating the holding capacity of the soil in which the ground anchor is placed. The shaft must be of suitable length for the full depth of the ground anchor.

⁴ The torque value is a measure of the load resistance provided by the soil when subject to the turning or twisting force of the probe.

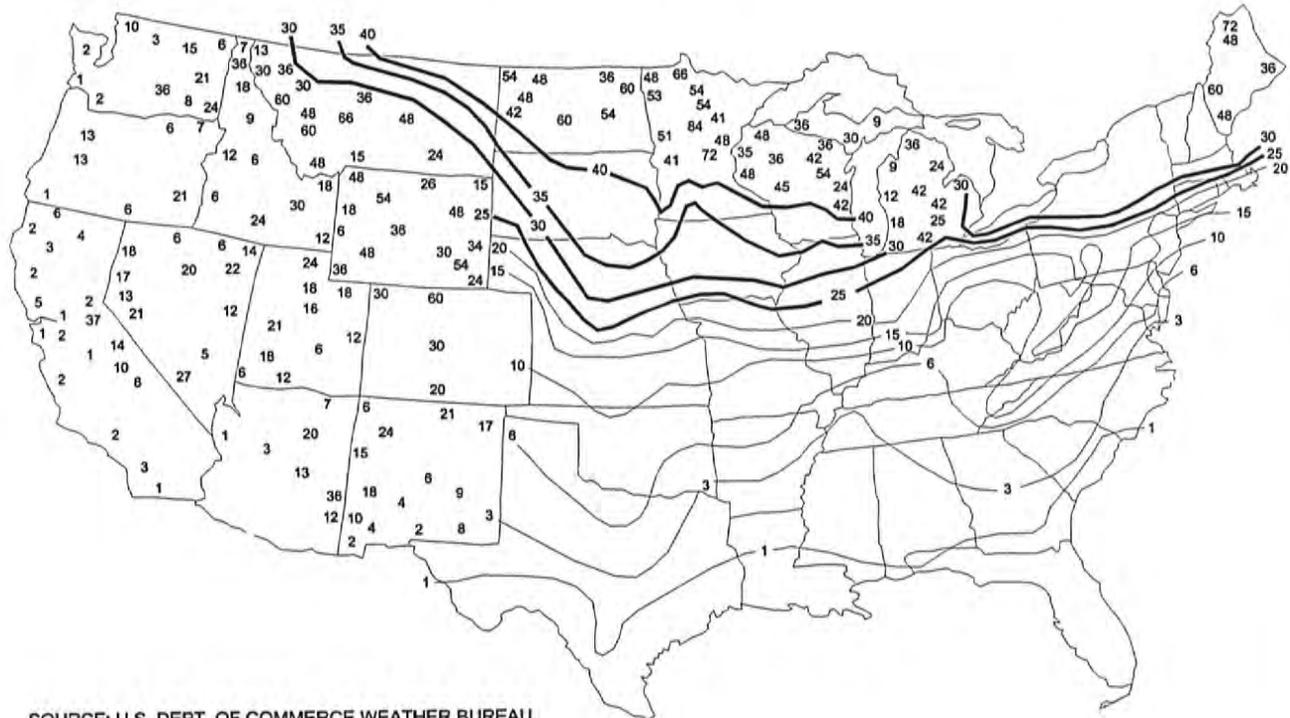
- **Use default capacity.** Use an allowable pressure of 1,500 psf, unless site-specific information requires the use of lower values based on soil classification and type according to **Table 4**.

Note that soil types may vary across a home site. In this case, the soil with the lowest bearing capacity should be assumed when designing the support system. Keep a record of the soil bearing capacity value; it will be used later to design the home's support system.

FROST LINE

Shown below is a map with recommended average depths of frost penetration. However, it is also recommended to consult the LAHJ, a registered engineer or registered architect to determine the depth of the frost line when possible. Keep a record of the frost depth; it will be used later to design the home's support system.

FROST PENETRATION MAP (AVERAGE DEPTH OF FROST PENETRATION - IN INCHES)



SOURCE: U.S. DEPT. OF COMMERCE WEATHER BUREAU

Figure 5A. Frost Penetration Map

Will this installation use auger-type ground anchors or concrete anchors?

- ▶ YES, go to **STEP 6, DETERMINE GROUND ANCHOR HOLDING CAPACITY**, (p. 19).
- ▶ NO, go to **Construct Foundation**, (p. 35).

STEP 6. DETERMINE GROUND ANCHOR HOLDING CAPACITY

If the anchor holding strength of the soil is unknown test the soil per the requirements of the anchor manufacturer's installation instructions. Concrete anchors that are listed and certified by a professional engineer to have a working load capacity of 3150 lbs may be used as a substitute for the ground anchors specified within this manual when installed in accordance with manufacturer's installation instructions.



Torque Probe. If a torque probe is used, check with the utility companies for the location of underground cables or pipes to avoid contact with the probe shaft.

What type of support system will this installation use?

- ▶ For pier and ground or concrete anchor, go to **Install Stabilizing Systems**, (p. 74)
- ▶ For load bearing perimeter wall, go to **Construct Foundation**, (p. 35)

Install Footings

This chapter provides instructions for the design and construction of individual footings that transfer the load from a single pier to the ground. A footing and pier together (discussed in **Set the Home**) is referred to as a "support". A footing may also be designed to carry the load of multiple piers (often called "strip" footings). The design of strip footings is not covered in this manual. However, strip footings are acceptable if designed by a registered engineer or registered architect. The foundation systems described in this manual have not been designed for flood resistance.

Follow the Steps below:

- ▼ STEP 1. DESIGN POINT LOAD SUPPORTS (p. 20)
- ▼ STEP 2. DESIGN FRAME SUPPORTS (Homes Without Perimeter Blocking) (p. 23)
- ▼ STEP 3. DESIGN FRAME AND PERIMETER SUPPORTS (Homes With Perimeter Blocking) (p.25)
- ▼ STEP 4. SELECT FOOTING MATERIALS (p. 30)
- ▼ STEP 5. SIZE FOOTINGS (p. 31)
- ▼ STEP 6. INSTALL FOOTINGS (p. 33)

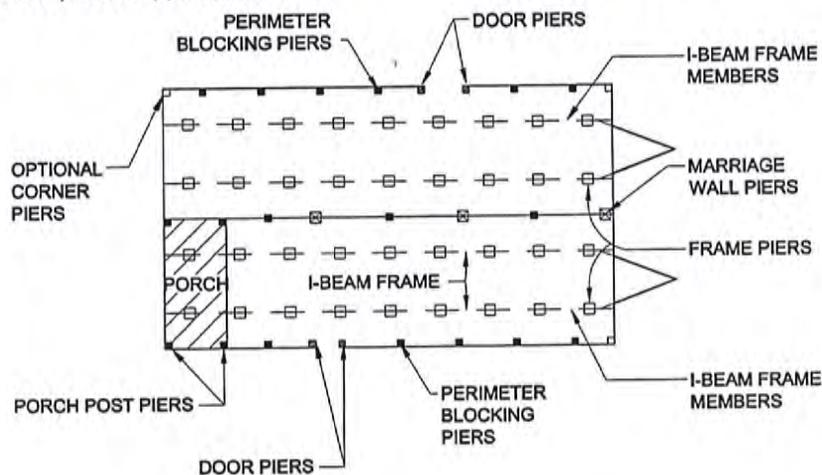
STEP 1. DESIGN POINT LOAD SUPPORTS

All homes will need supports, and therefore footings, under the frame, marriage line (for multi-section homes), exterior wall openings and other heavy point loads.

All pier locations required at the mating line, perimeter and any special pier support locations, as required by these instructions, will be identified from the factory by a pier tag, label, paint, or other means and must be visible after the home is installed. The pier designs, support loads, and footing construction shall be as indicated in the appropriate diagrams, tables, and instructions herein. Where perimeter piers are required along the exterior wall, alternate pier spacing may be used in lieu of the factory identified locations provided the instructions of this manual are satisfied in terms of allowable spacing, pier design, and footing size.

PLEASE NOTE: The manufacturer will not be responsible for damaged or removed pier tags. It is the responsibility of the installer to ensure that all piers are properly positioned in accordance with the tables & diagrams contained in these installation instructions.

Create a sketch of the home that includes the exterior walls, the frame I-beams and the marriage line(s), if a multi-section home. The sketch will be used in this chapter to locate each support, and note the size of the corresponding footing. **Figure 6** is an example of such a completed support plan.



High roof loads. For roof loads of 40 psf or greater, a registered engineer or registered architect must determine the maximum marriage wall opening permitted without pier or other supports.

Figure 6. Typical point-load support locations

As the location and load for each support is determined, note it on the sketch. When selecting locations for supports, keep in mind that increasing the spacing between supports will increase the load on that support and the size of the required footing.

DETERMINE LOCATIONS

Point loads exist where a bearing/structural weight is concentrated and transferred to the foundation at a specific point. Locate a support under each point load, including the following examples:

- Exterior doors in side walls at both sides of each door (blocking is not required at exterior doors in end walls supported by the steel header).
- Other exterior wall openings four feet and greater at both sides of each opening (including multiple windows that total four feet wide or more without intermediate supports, even if individual windows are less than four feet).
- Marriage line openings four feet or greater at both sides of each opening.
- Locations where through-the-rim crossover ducts penetrate the rim joist at the marriage line (unless otherwise noted in supplemental documents provided with the home or unless the home is constructed with a perimeter frame system).
- Marriage line columns.
- Load-bearing porch posts.
- On each side of factory installed fireplaces when located on the exterior sidewalls or marriage walls (except when supported by the steel header).

Adjustable outriggers may only be used to replace piers below exterior door or window openings less than 48" and below factory installed fireplaces located on the exterior sidewalls or marriage walls. Adjustable outriggers may only be used at these locations when local codes permit the use of these devices and they are installed according to the manufacturer's installation instructions. Adjustable outriggers are not an acceptable replacement for perimeter supports on homes requiring perimeter blocking. Factory installed outriggers and crossmembers may also replace piers below exterior door or window openings less than 48".

Mark the required point load support locations on the sketch. Supports are not required where the manufacturer has reinforced the floor (such as with additional outriggers or floor joists) and so noted in the documentation provided with the home.

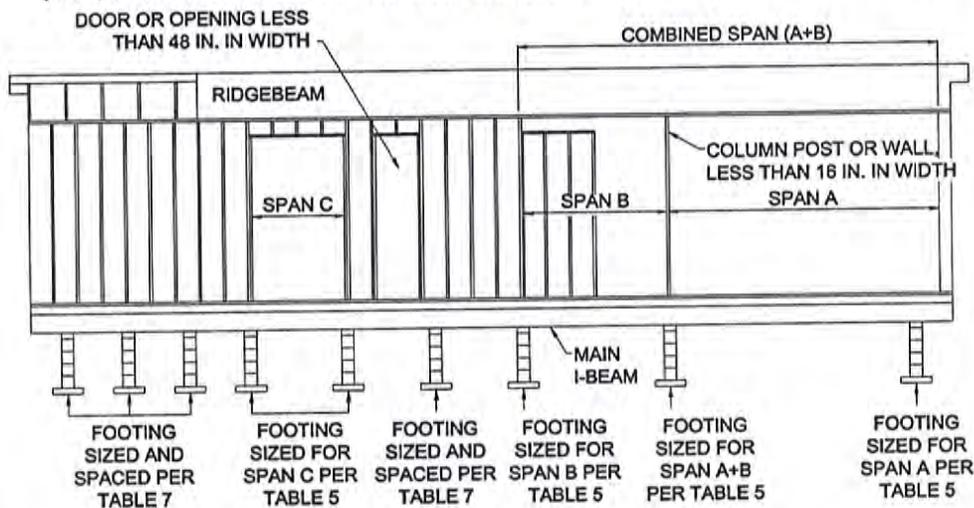


Figure 7. Typical point-load support locations along the marriage line.

CALCULATE LOADS

Use Tables 5-5c to determine the loads on point load supports (columns). For each support, find the table with the appropriate section width. Then, find the row with the appropriate roof load zone and the column corresponding to the span (see Figure 7 for guidance on determining spans — if a support is shared by spans on both sides, add the respective loads together to arrive at the total load under that point). The number in the intersecting cell is the load.

Note the required loads next to each point load support on the sketch.

Install Footings

TABLE 5. POINT LOAD ON FOOTINGS AT MARRIAGE LINE OPENINGS (LBS)

		20 ft Max. Home Width													
Roof Live Load (PSF)		Maximum Opening in Marriage Line (ft)													
		4	8	12	14	16	18	20	24	28	32	36	40	44	48
20		1000	1600	2200	2500	2800	3100	3400	4000	4600	5200	5800	6400	7000	7600
30		2000	2800	3600	4000	4400	4800	5200	6000	6800	7600	8400	9200	10000	10800
40		2400	3400	4400	4900	5400	5900	6400	7400	8400	9400	10400	11400	12400	13400
60		3200	4600	6000	6700	7400	8100	8800	10200	11600	13000	14400	15800	17200	18600
80		4000	5800	7600	8500	9400	10300	11200	13000	14800	16600	18400	20200	22000	23800
100		4800	7000	9200	10300	11400	12500	13600	15800	18000	20200	22400	24600	26800	29000
120		5600	8200	10800	12100	13400	14700	16000	18600	21200	23800	26400	29000	31600	34200

TABLE 5a. POINT LOAD ON FOOTINGS AT MARRIAGE LINE OPENINGS (LBS)

		24 ft Double Section /36 ft Triple Section Max. Home Width													
Roof Live Load (PSF)		Maximum Opening in Marriage Line (ft)													
		4	8	12	14	16	18	20	24	28	32	36	40	44	48
20		1120	1840	2560	2920	3280	3640	4000	4720	5440	6160	6880	7600	8320	9040
30		2320	3280	4240	4720	5200	5680	6160	7120	8080	9040	10000	10960	11920	12880
40		2800	4000	5200	5800	6400	7000	7600	8800	10000	11200	12400	13600	14800	16000
60		3760	5440	7120	7960	8800	9640	10480	12160	13840	15520	17200	18880	20560	22240
80		4720	6880	9040	10120	11200	12280	13360	15520	17680	19840	22000	24160	26320	28480
100		5680	8320	10960	12280	13600	14920	16240	18880	21520	24160	26800	29440	32080	34720
120		6640	9760	12880	14440	16000	17560	19120	22240	25360	28480	31600	34720	37840	40960

TABLE 5b. POINT LOAD ON FOOTINGS AT MARRIAGE LINE OPENINGS (LBS)

		28 ft Double Section /42 ft Triple Section Max. Home Width													
Roof Live Load (PSF)		Maximum Opening in Marriage Line (ft)													
		4	8	12	14	16	18	20	24	28	32	36	40	44	48
20		1240	2080	2920	3340	3760	4180	4600	5440	6280	7120	7960	8800	9640	10480
30		2640	3760	4880	5440	6000	6560	7120	8240	9360	10480	11600	12720	13840	14960
40		3200	4600	6000	6700	7400	8100	8800	10200	11600	13000	14400	15800	17200	18600
60		4320	6280	8240	9220	10200	11180	12160	14120	16080	18040	20000	21960	23920	25880
80		5440	7960	10480	11740	13000	14260	15520	18040	20560	23080	25600	28120	30640	33160
100		6560	9640	12720	14260	15800	17340	18880	21960	25040	28120	31200	34280	37360	40440
120		7680	11320	14960	16780	18600	20420	22240	25880	29520	33160	36800	40440	44080	47720

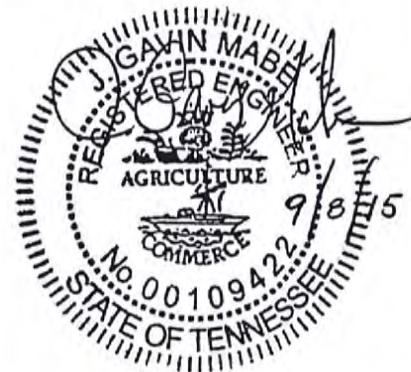


TABLE 5c. POINT LOAD ON FOOTINGS AT MARRIAGE LINE OPENINGS (LBS)

32 ft Double Section /48 ft Triple Section Max. Home Width

Roof Live Load (PSF)	Maximum Opening in Marriage Line (ft)													
	4	8	12	14	16	18	20	24	28	32	36	40	44	48
20	1330	2260	3190	3655	4120	4585	5050	5980	6910	7840	8770	9700	10630	11560
30	2880	4120	5360	5980	6600	7220	7840	9080	10320	11560	12800	14040	15280	16520
40	3500	5050	6600	7375	8150	8925	9700	11250	12800	14350	15900	17450	19000	20550
60	4740	6910	9080	10165	11250	12335	13420	15590	17760	19930	22100	24270	26440	28610
80	5980	8770	15560	12955	14350	15745	17140	19930	22720	25510	28300	31090	33880	36670
100	7220	10630	14040	15745	17450	19155	20860	24270	27680	31090	34500	37910	41320	44730
120	8460	12490	16520	18535	20550	22565	24580	28610	32640	36670	40700	44730	48760	52790

Determine from the data plate and/or labels along the perimeter if the home requires perimeter blocking.

- ▶ If perimeter blocking is NOT required, go to **STEP 2, DESIGN FRAME SUPPORTS** (Homes Without Perimeter Blocking), (p. 23).
- ▶ If perimeter blocking is required, go to **STEP 3, DESIGN FRAME AND PERIMETER SUPPORTS** (Homes With Perimeter Blocking), (p. 25).

STEP 2. DESIGN FRAME SUPPORTS (Homes Without Perimeter Blocking)

DETERMINE LOCATIONS

All homes require regularly spaced supports along all main frame I-beams. Select spacing between supports and sketch them on the support plan. Keep in mind that frame supports under homes with 8" deep I-beams may be no more than eight feet apart. Those under homes with 10" or 12" deep I-beams may be no more than 10 feet apart. Generally, greater distances between supports will require larger footings. **Figure 8** shows typical frame support locations.



Spacing frame supports.

There must be a support pier located near the end of each I-beam such that there is no more than 24 inches as measured from the outside edge of the floor to the center of the pier.

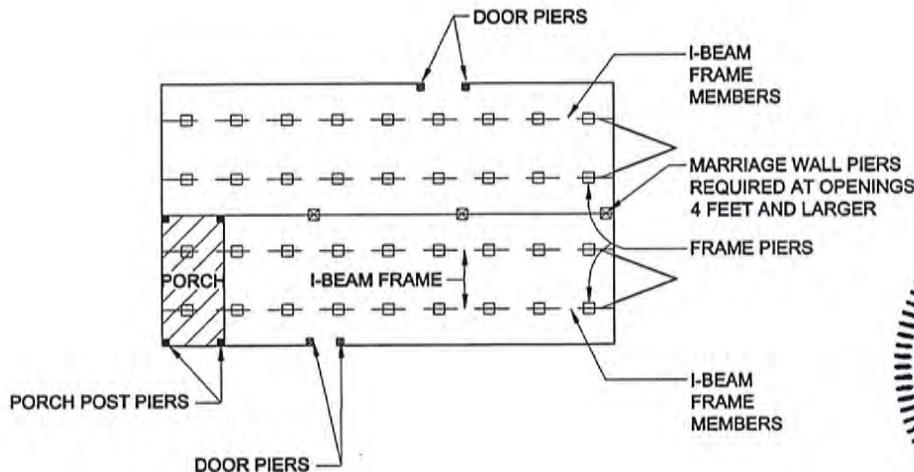
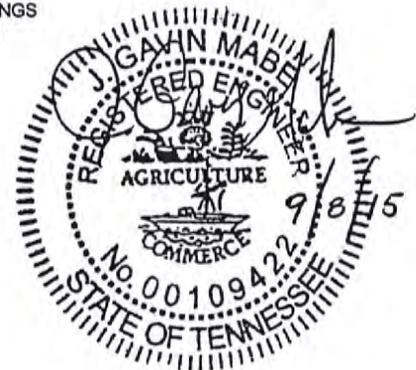


Figure 8. Typical support locations for homes not requiring regularly spaced perimeter supports



Install Footings

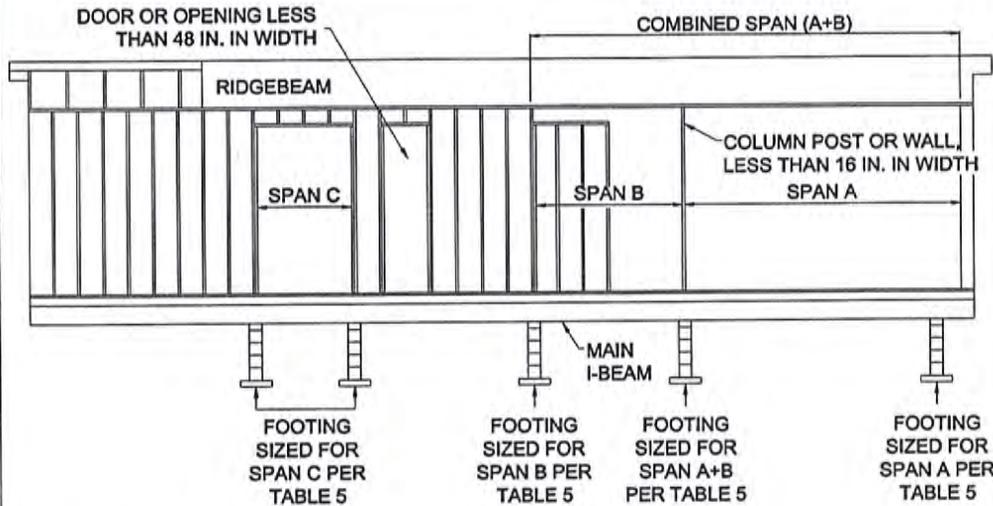


Figure 8A. Typical marriage line support locations for homes not requiring perimeter supports

CALCULATE LOADS

Use Tables 6-6c to determine the loads on frame supports. Find the chart with the appropriate sidewall eave overhang. Then, find the column with the appropriate roof load zone and section width. Find the row corresponding to the selected support spacing. The number in the intersecting cell is the load.

Loads on all frame supports can be assumed to be equal if support spacing is equal. However, if different support spacings are used then each support with a different spacing should be calculated separately.

Loads for piers installed at 5, 7 and 9 feet on-center can be estimated by adding the loads for the higher and lower spacing and dividing in half (eg. the load for piers installed at 7 feet on-center for a 16 wide with a 1-1/2" overhang in a 20 psf Roof Load Zone would be: 4510 lbs + 5666 lbs = 10176 lbs / 2 = 5088 lbs).

Note the location and load required of each support on the sketch. (Width listed in each column of the following charts is the overall width of the home. Eg. 16 ft is a single section, 32 ft is a double section and 48 ft is a triple section).

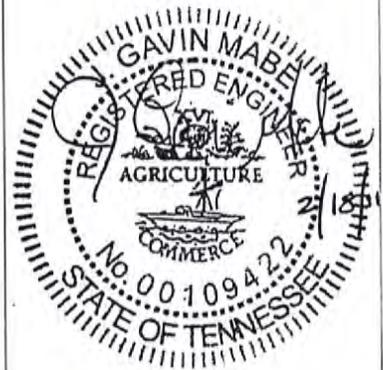


TABLE 6. LOAD ON FRAME PIER FOOTINGS FOR HOMES NOT REQUIRING PERIMETER BLOCKING EXCEPT AT OPENINGS (LBS)

Pier Spacing	Roof Load Zone and Max. Home Width (1-1/2" Max. Sidewall Eave Overhang)														
	South (20 psf)					Middle (30 psf)					North (40 psf)				
	10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft
Up to 4'	2195	2519	2843	3140	3410	2400	2764	3128	3462	3765	2605	3009	3413	3783	4120
> 4' to 6'	3093	3579	4065	4510	4915	3400	3946	4492	4993	5448	3708	4314	4920	5475	5980
> 6' to 8'	3990	4638	5286	5666	6420	4400	5128	5856	6523	7130	4810	5618	6426	7167	7840
> 8' to 10'	4888	5698	6508	7250	7925	5400	6310	7220	8054	8813	5913	6923	7933	8858	9700

TABLE 6a. LOAD ON FRAME PIER FOOTINGS FOR HOMES NOT REQUIRING PERIMETER BLOCKING EXCEPT AT OPENINGS (LBS)

Pier Spacing	Roof Load Zone and Max. Home Width (6" Max. Sidewall Eave Overhang)														
	South (20 psf)					Middle (30 psf)					North (40 psf)				
	10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft
Up to 4'	2240	2564	2888	3185	3455	2460	2824	3188	3522	3825	2680	3084	3488	3858	4195
> 4' to 6'	3160	3646	4132	4578	4983	3490	4036	4582	5083	5538	3820	4426	5032	5588	6093
> 6' to 8'	4080	4728	5376	5750	6510	4520	5248	5976	6643	7250	4960	5768	6576	7317	7990
> 8' to 10'	5000	5810	6620	7363	8038	5550	6460	7370	8204	8963	6100	7110	8120	9046	9888

Install Footings

TABLE 6b. LOAD ON FRAME PIER FOOTINGS FOR HOMES NOT REQUIRING PERIMETER BLOCKING EXCEPT AT OPENINGS (LBS)

Roof Load Zone and Max. Home Width (12" Max. Sidewall Eave Overhang)												
Pier Spacing	South (20 psf)				Middle (30 psf)				North (40 psf)			
	10/20 ft	12/24 ft	14/28/42 ft	16/32/48 ft	10/20 ft	12/24 ft	14/28/42 ft	16/32/48 ft	10/20 ft	12/24 ft	14/28/42 ft	16/32/48 ft
Up to 4'	2300	2624	2948	3191	2540	2904	3268	3541	2780	3184	3588	3891
> 4' to 6'	3250	3736	4222	4587	3610	4156	4702	5112	3970	4576	5182	5637
> 6' to 8'	4200	4848	5496	5757	4680	5408	6136	6682	5160	5968	6776	7382
> 8' to 10'	5150	5960	6770	7378	5750	6660	7570	8253	6350	7360	8370	9128

TABLE 6c. LOAD ON FRAME PIER FOOTINGS FOR HOMES NOT REQUIRING PERIMETER BLOCKING EXCEPT AT OPENINGS (LBS)

Roof Load Zone and Max. Home Width (24" Max. Sidewall Eave Overhang)												
Pier Spacing	South (20 psf)				Middle (30 psf)				North (40 psf)			
	20 ft	24 ft	28/42 ft	32/48 ft	20 ft	24 ft	28/42 ft	32/48 ft	20 ft	24 ft	28/42 ft	32/48 ft
Up to 4'	2420	2744	3068	3311	2700	3064	3428	3701	2980	3384	3788	4091
> 4' to 6'	3430	3916	4402	4767	3850	4396	4942	5352	4270	4876	5482	5937
> 6' to 8'	4440	5088	5736	6222	5000	5728	6456	7002	5560	6368	7176	7782
> 8' to 10'	5450	6260	7070	7678	6150	7060	7970	8653	6850	7860	8870	9628

Calculate Loads

Use Table 6d to determine the loads on supports below openings in the sidewall when perimeter blocking is not required. Find the row with the appropriate opening span. Then, find the column with the appropriate floor width. The number in the intersecting cell is the load.

TABLE 6d. LOAD ON PIER FOOTINGS AT OPENINGS ALONG THE SIDEWALL (LBS)

Roof Load Zone and Max. Home Width (24" Max. Sidewall Eave Overhang)											
Pier Spacing	South (20 psf)					Pier Spacing	South (20 psf)				
	10/20 ft	12/24 ft	14/28/42 ft	16/32/48 ft	18 ft		10/20 ft	12/24 ft	14/28/42 ft	16/32/48 ft	18 ft
Up to 3'	1025	1100	1175	1244	1306	>5' to 6'	1400	1520	1640	1750	1850
> 3' to 4'	1150	1240	1330	1413	1488	>6' to 8'	1650	1800	1950	2088	2213
> 4' to 5'	1275	1380	1485	1581	1669	>8' to 10'	1900	2080	2260	2425	2575
Pier Spacing	Middle (30 psf)					Pier Spacing	Middle (30 psf)				
	10/20 ft	12/24 ft	14/28/42 ft	16/32/48 ft	18 ft		10/20 ft	12/24 ft	14/28/42 ft	16/32/48 ft	18 ft
Up to 3'	1200	1300	1400	1492	1575	>5' to 6'	1680	1840	2000	2147	2280
> 3' to 4'	1360	1480	1600	1710	1810	>6' to 8'	2000	2200	2400	2583	2750
> 4' to 5'	1520	1660	1800	1928	2045	>8' to 10'	2320	2560	2800	3020	3220
Pier Spacing	North (40 psf)					Pier Spacing	North (40 psf)				
	10/20 ft	12/24 ft	14/28/42 ft	16/32/48 ft	18 ft		10/20 ft	12/24 ft	14/28/42 ft	16/32/48 ft	18 ft
Up to 3'	1375	1500	1625	1740	1844	>5' to 6'	1960	2160	2360	2543	2710
> 3' to 4'	1570	1720	1870	2008	2133	>6' to 8'	2350	2600	2850	3079	3288
> 4' to 5'	1765	1940	2115	2275	2421	>8' to 10'	2740	3040	3340	3665	3965

▶ go to **STEP 4. SELECT FOOTING MATERIALS** (p. 30)

STEP 3. DESIGN FRAME AND PERIMETER SUPPORTS (Homes With Perimeter Blocking)

DETERMINE LOCATIONS

Depending on design and location, some homes require regularly spaced perimeter supports along all of the sidewalls and marriage walls in addition to frame supports. If required, perimeter support locations will be identified by labels attached along the bottom of the sidewalls and marriagewalls and noted on the Data Plate. A pier support will be required at

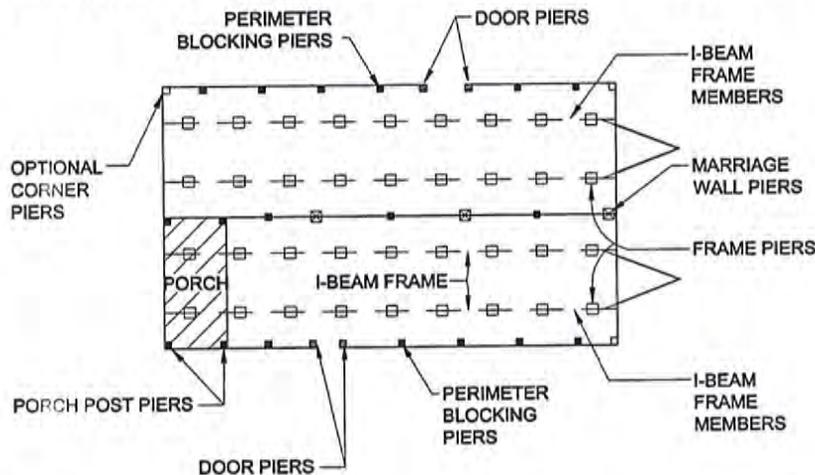


Install Footings

each of the label locations. Additionally, perimeter support locations may be identified by a white stripe or mark beneath the home on the bottom board material. Perimeter blocking supports must be placed no further than 8 feet on-center.

If required, perimeter supports are only needed on bearing walls. For 20 psf roof live load, perimeter support is only required at exterior doors and other openings 48" and larger, unless noted otherwise. Supports may be added at each corner of each endwall for leveling purposes, but are not required. Bearing walls are those walls that support the ends of roof trusses or rafters (typically sidewalls and marriage walls but not end walls of main units or sidewalls of tag units).

To minimize the number of required perimeter supports, space them evenly between point load supports as shown in **Figure 9** and **Figure 10** (but not under open spans). These figures identify typical support locations for homes requiring perimeter supports.



pier located near the end of each I-beam such that there is no more than 24 inches as measured from the outside edge of the floor to the center of the pier.

Figure 9. Typical support locations for homes requiring perimeter supports

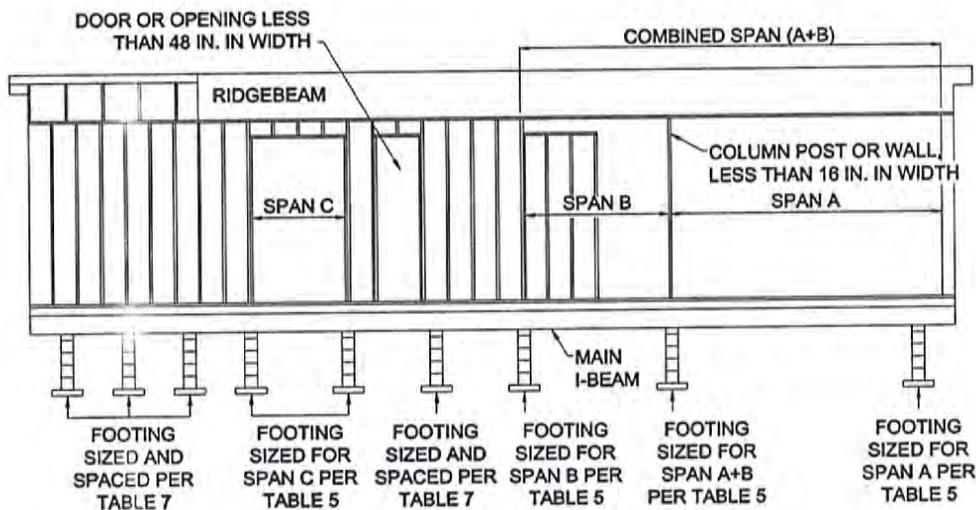


Figure 10. Typical marriage line support locations for homes requiring perimeter supports

CALCULATE LOADS

Use **Tables 7-7c** to determine the loads on frame and perimeter supports for homes requiring perimeter blocking. Find the chart with the appropriate sidewall eave overhang. Then, find the column with the appropriate roof load and section width. Find the group of rows corresponding to the selected support spacing. The values in the intersecting cells are the loads for the frame, perimeter and marriage line supports respectively.

Loads on supports of a given type (frame, perimeter or marriage) can be assumed to be equal if support spacing is equal. However, if different support spacings are used then each support with a different spacing should be calculated separately.

Loads for piers installed at 5, 7 and 9 feet on-center can be estimated by adding the loads



A perimeter support must be installed within 4 feet of column supports and the corner of the home when the home is designated for perimeter blocking. The loads listed in **Tables 5** for homes greater than 20 psf roof load include

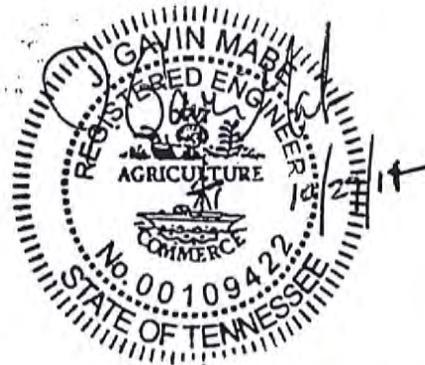
for the higher and lower spacing and dividing in half (eg. the load for frame piers installed at 7 feet on-center for a 16 wide with a 1-1/2" overhang in a 20 psf Roof Load Zone would be: 2823 lbs + 3630 lbs = 6453 lbs / 2 = 3227 lbs).

the additional 4 foot span.

Note the location and load required of each support on the sketch.
(Width listed in each column of the following charts is the overall width of the home. Eg. 16 ft is a single section, 32 ft is a double section and 48 ft is a triple section).

TABLE 7. LOAD ON FRAME AND PERIMETER PIER FOOTINGS FOR HOMES REQUIRING PERIMETER BLOCKING (LBS)

		Roof Load Zone and Max. Home Width (1-1/2" Max. Sidewall Eave Overhang)																			
Pier		South (20 psf)					Middle (30 psf)					North (40 psf)					North (60 psf)				
Spacing	Location	10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft
Up to 4'	Frame	1420	1624	1828	2015	2185	1420	1624	1828	2015	2185	1420	1624	1828	2015	2185	1420	1624	1828	2015	2185
Up to 4'	Sidewall	1175	1295	1415	1525	1625	1380	1540	1700	1847	1980	1585	1785	1985	2168	2335	1995	2275	2555	2812	3045
> 4' to 6'	Frame	1930	2236	2542	2823	3078	1930	2236	2542	2823	3078	1930	2236	2542	2823	3078	1930	2236	2542	2823	3078
> 4' to 6'	Sidewall	1563	1743	1923	2088	2238	1870	2110	2350	2570	2770	2178	2478	2778	3053	3303	2793	3213	3633	4018	4368
> 6' to 8'	Frame	2440	2848	3256	3630	3970	2440	2848	3256	3630	3970	2440	2848	3256	3630	3970	2440	2848	3256	3630	3970
> 6' to 8'	Sidewall	1950	2190	2430	2650	2850	2360	2680	3000	3293	3560	2770	3170	3570	3937	4270	3590	4150	4710	5223	5690
> 8' to 10'	Frame	2950	3460	3970	4438	4863	2950	3460	3970	4438	4863	2950	3460	3970	4438	4863	2950	3460	3970	4438	4863
Pier		North (80 psf)					North (100 psf)					North (120 psf)									
Spacing	Location	10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft					
Up to 4'	Frame	1420	1624	1828	2015	2185	1420	1624	1828	2015	2185	1420	1624	1828	2015	2185					
Up to 4'	Sidewall	2405	2765	3125	3455	3755	2815	3255	3695	4098	4465	3225	3745	4265	4742	5175					
> 4' to 6'	Frame	1930	2236	2542	2823	3078	1930	2236	2542	2823	3078	1930	2236	2542	2823	3078					
> 4' to 6'	Sidewall	3408	3948	4488	4983	5433	4023	4683	5343	5948	6498	4638	5418	6198	6913	7563					
> 6' to 8'	Frame	2440	2848	3256	3630	3970	2440	2848	3256	3630	3970	2440	2848	3256	3630	3970					
> 6' to 8'	Sidewall	4410	5130	5850	6510	7110	5230	6110	6990	7797	8530	6050	7090	8130	9083	9950					
> 8' to 10'	Frame	2950	3460	3970	4438	4863	2950	3460	3970	4438	4863	2950	3460	3970	4438	4863					



Install Footings

TABLE 7a. LOAD ON FRAME AND PERIMETER PIER FOOTINGS FOR HOMES REQUIRING PERIMETER BLOCKING (LBS)

Roof Load Zone and Max. Home Width (6" Max. Sidewall Eave Overhang)

Pier Spacing		South (20 psf)					Middle (30 psf)					North (40 psf)					North (60 psf)				
		10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft
Up to 4'	Frame	1420	1624	1828	2015	2185	1420	1624	1828	2015	2185	1420	1624	1828	2015	2185	1420	1624	1828	2015	2185
Up to 4'	Sidewall	1220	1340	1460	1570	1670	1440	1600	1760	1907	2040	1660	1860	2060	2243	2410	2100	2380	2660	2917	3150
> 4' to 6'		1930	2236	2542	2823	3078	1930	2236	2542	2823	3078	1930	2236	2542	2823	3078	1930	2236	2542	2823	3078
> 4' to 6'	Side	1630	1810	1990	2155	2305	1960	2200	2440	2660	2860	2290	2590	2890	3165	3415	2950	3370	3790	4175	4525
> 6' to 8'		2440	2848	3256	3630	3970	2440	2848	3256	3630	3970	2440	2848	3256	3630	3970	2440	2848	3256	3630	3970
> 6' to 8'		2040	2280	2520	2740	2940	2480	2800	3120	3413	3680	2920	3320	3720	4087	4420	3800	4360	4920	5433	5900
> 8' to 10'		2950	3460	3970	4438	4863	2950	3460	3970	4438	4863	2950	3460	3970	4438	4863	2950	3460	3970	4438	4863
Pier Spacing		North (80 psf)					North (100 psf)					North (120 psf)									
		10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft	10 ft	12 ft	14 ft	16 ft	18 ft					
Up to 4'		1420	1624	1828	2015	2185	1420	1624	1828	2015	2185	1420	1624	1828	2015	2185					
Up to 4'	Side	2540	2900	3260	3590	3890	2980	3420	3860	4263	4630	3420	3940	4460	4937	5370					
> 4' to 6'		1930	2236	2542	2823	3078	1930	2236	2542	2823	3078	1930	2236	2542	2823	3078					
> 4' to 6'		3610	4150	4690	5185	5635	4270	4930	5590	6195	6745	4930	5710	6490	7205	7855					
> 6' to 8'		2440	2848	3256	3630	3970	2440	2848	3256	3630	3970	2440	2848	3256	3630	3970					
> 6' to 8'		4680	5400	6120	6780	7380	5560	6440	7320	8127	8860	6440	7480	8520	9473	10340					
> 8' to 10'		2950	3460	3970	4438	4863	2950	3460	3970	4438	4863	2950	3460	3970	4438	4863					



TABLE 7b. LOAD ON FRAME AND PERIMETER PIER FOOTINGS FOR HOMES REQUIRING PERIMETER BLOCKING (LBS)

Roof Load Zone and Max. Home Width (12" Max. Sidewall Eave Overhang)

Pier Spacing	Foundation	South (20 psf)				Middle (30 psf)				North (40 psf)				North (60 psf)			
		20 ft	24/36 ft	28/42 ft	32/48 ft	20 ft	24/36 ft	28/42 ft	32/48 ft	20 ft	24/36 ft	28/42 ft	32/48 ft	20 ft	24/36 ft	28/42 ft	32/48 ft
Up to 4'	Frame	1420	1624	1828	1981	1420	1624	1828	1981	1420	1624	1828	1981	1420	1624	1828	1981
Up to 4'	Side wall	1280	1400	1520	1610	1520	1680	1840	1960	1760	1960	2160	2310	2240	2520	2800	3010
Up to 4'	Marriage wall	1760	2000	2240	2420	2160	2480	2800	3040	2560	2960	3360	3660	3360	3920	4480	4900
> 4' to 6'	Frame	1930	2236	2542	2772	1930	2236	2542	2772	1930	2236	2542	2772	1930	2236	2542	2772
> 4' to 6'	Side wall	1720	1900	2080	2215	2080	2320	2560	2740	2440	2740	3040	3265	3160	3580	4000	4315
> 4' to 6'	Marriage wall	2440	2800	3160	3430	3040	3520	4000	4360	3640	4240	4840	5290	4840	5680	6520	7150
> 6' to 8'	Frame	2440	2848	3256	3562	2440	2848	3256	3562	2440	2848	3256	3562	2440	2848	3256	3562
> 6' to 8'	Side wall	2160	2400	2640	2820	2640	2960	3280	3520	3120	3520	3920	4220	4080	4640	5200	5620
> 6' to 8'	Marriage wall	3120	3600	4080	4440	3920	4560	5200	5680	4720	5520	6320	6920	6320	7440	8560	9400
> 8' to 10'	Frame	2950	3460	3970	4353	2950	3460	3970	4353	2950	3460	3970	4353	2950	3460	3970	4353

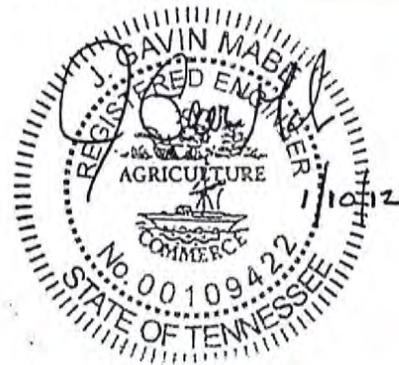
Pier Spacing	Foundation	North (80 psf)				North (100 psf)				North (120 psf)			
		20 ft	24 ft	28/42 ft	32/48 ft	20 ft	24 ft	28/42 ft	32/48 ft	20 ft	24 ft	28/42 ft	32/48 ft
Up to 4'	Frame	1420	1624	1828	1981	1420	1624	1828	1981	1420	1624	1828	1981
Up to 4'	Side wall	2720	3080	3440	3710	3200	3640	4080	4410	3680	4200	4720	5110
Up to 4'	Marriage wall	4160	4880	5600	6140	4960	5840	6720	7380	5760	6800	7840	8620
> 4' to 6'	Frame	1930	2236	2542	2772	1930	2236	2542	2772	1930	2236	2542	2772
> 4' to 6'	Side wall	3880	4420	4960	5365	4600	5260	5920	6415	5320	6100	6880	7465
> 4' to 6'	Marriage wall	6040	7120	8200	9010	7240	8560	9880	10870	8440	10000	11560	12730
> 6' to 8'	Frame	2440	2848	3256	3562	2440	2848	3256	3562	2440	2848	3256	3562
> 6' to 8'	Side wall	5040	5760	6480	7020	6000	6880	7760	8420	6960	8000	9040	9820
> 6' to 8'	Marriage wall	7920	9360	10800	11880	9520	11280	13040	14360	11120	13200	15280	16840
> 8' to 10'	Frame	2950	3460	3970	4353	2950	3460	3970	4353	2950	3460	3970	4353



TABLE 7c. LOAD ON FRAME AND PERIMTER PIER FOOTINGS FOR HOMES REQUIRING PERIMETER BLOCKING (LBS)

Roof Load Zone and Max. Home Width (24" Max. Sidewall Eave Overhang)

Roof Load Zone	South (20 psf)				Middle (30 psf)				North (40 psf)				North (60 psf)			
	20 ft	24/36 ft	28/42 ft	32/48 ft	20 ft	24/36 ft	28/42 ft	32/48 ft	20 ft	24/36 ft	28/42 ft	32/48 ft	20 ft	24/36 ft	28/42 ft	32/48 ft
Up to 4' Sidewall	1420	1624	1828	1981	1420	1624	1828	1981	1420	1624	1828	1981	1420	1624	1828	1981
Up to 4' Sidewall	1400	1520	1640	1730	1680	1840	2000	2120	1960	2160	2360	2510	2520	2800	3080	3290
Up to 4' Sidewall	1760	2000	2240	2420	2160	2480	2800	3040	2560	2960	3360	3660	3360	3920	4480	4900
Up to 4' Sidewall	1930	2236	2542	2772	1930	2236	2542	2772	1930	2236	2542	2772	1930	2236	2542	2772
Up to 6' Sidewall	1900	2080	2260	2395	2320	2560	2800	2980	2740	3040	3340	3565	3580	4000	4420	4735
Up to 6' Sidewall	2440	2800	3160	3430	3040	3520	4000	4360	3640	4240	4840	5290	4840	5680	6520	7150
Up to 8' Sidewall	2440	2848	3256	3562	2440	2848	3256	3562	2440	2848	3256	3562	2440	2848	3256	3562
Up to 8' Sidewall	2400	2640	2880	3060	2960	3280	3600	3840	3520	3920	4320	4620	4640	5200	5760	6180
Up to 8' Sidewall	3120	3600	4080	4440	3920	4560	5200	5680	4720	5520	6320	6920	6320	7440	8560	9400
Up to 8' Sidewall	2950	3460	3970	4353	2950	3460	3970	4353	2950	3460	3970	4353	2950	3460	3970	4353
South	North (80 psf)				North (100 psf)				North (120 psf)							
	20 ft	24 ft	28/42 ft	32/48 ft	20 ft	24 ft	28/42 ft	32/48 ft	20 ft	24 ft	28/42 ft	32/48 ft				
Up to 4' Sidewall	1420	1624	1828	1981	1420	1624	1828	1981	1420	1624	1828	1981				
Up to 4' Sidewall	3080	3440	3800	4070	3640	4080	4520	4850	4200	4720	5240	5630				
Up to 4' Sidewall	4160	4880	5600	6140	4960	5840	6720	7380	5760	6800	7840	8620				
Up to 4' Sidewall	1930	2236	2542	2772	1930	2236	2542	2772	1930	2236	2542	2772				
Up to 4' Sidewall	4420	4960	5500	5905	5260	5920	6580	7075	6100	6880	7660	8245				
Up to 4' Sidewall	6040	7120	8200	9010	7240	8560	9880	10870	8440	10000	11560	12730				
Up to 4' Sidewall	2440	2848	3256	3562	2440	2848	3256	3562	2440	2848	3256	3562				
Up to 4' Sidewall	5760	6480	7200	7740	6880	7760	8640	9300	8000	9040	10080	10860				
Up to 4' Sidewall	7920	9360	10800	11880	9520	11280	13040	14360	11120	13200	15280	16840				
Up to 4' Sidewall	2950	3460	3970	4353	2950	3460	3970	4353	2950	3460	3970	4353				



SELECT FOOTING MATERIAL

Use the products and materials from Table 8 for the footings.

FOOTING MATERIALS

	Appropriate Use	Specification
Concrete	All soil types	Minimum 6" thick poured-in-place concrete pads, slabs, or ribbons with at least a 28 day compressive strength of 3,000 psi. Cast-in-place concrete footings may also require reinforcing steel based on acceptable engineering practice, the design loads, and site specific soil conditions.
Concrete	All soil types	Minimum 4" thick nominal precast concrete pads meeting or exceeding ASTM C 90-02a, Standard Specification for Load Bearing Concrete Masonry Units, without reinforcement, with at least a 28 day compressive strength of 1,200 psi
Concrete	Stable soils	Use in accordance with the pad manufacturer's instructions. Must be certified for use in the soil classification at the site, listed or labeled for the required load capacity.
Foundation Systems	Consult system manufacturer	Consult system manufacturer

Will footings be concrete?

If YES, go to **STEP 5, SIZE FOOTING**, (p. 31).

If NO, see footing system manufacturer's instructions, then go to **Set the Home** (p. 38).

STEP 5. SIZE FOOTINGS

If the load on the footing and the soil bearing capacity are known, calculate the size of the footing as follows:

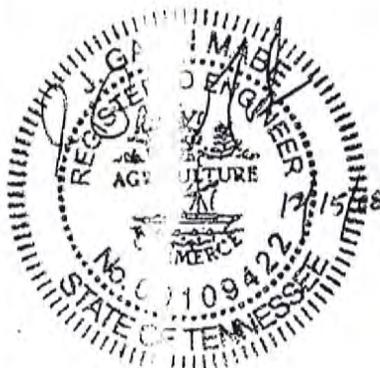
1. From **Table 9** determine if the pier is to be of single stack blocks (8 inch x 16 inch) or double stack blocks (16 inch x 16 inch).
2. Locate the group of columns in **Table 10** with the soil bearing capacity determined in **Prepare the Site, STEP 5. DETERMINE SOIL BEARING CAPACITY AND FROST LINE** (p. 17). Use the next lowest value if the exact value does not appear.
3. Find the row corresponding to the pier capacity required by Tables 5, 6 or 7. Then, read across the table to determine the minimum required footing area for the corresponding pier capacity and soil bearing capacity.
4. The required footing size and pier capacity may be changed by selecting different support spacing.

TABLE 9. PIER CONFIGURATION

Pier Height	Configuration	Maximum load (lbs)	
		Without Mortar	With Mortar
Less than 36 in *	Single stack blocks with long side perpendicular to frame I-beam or parallel to perimeter rail (rim joist)	5,760	7,680
36" Max.	Double, interlocked blocks	11,520	15,360
54" Max.	Triple, interlocked blocks	17,280	23,034
8" Max. **	Double, interlocked blocks	NA	39,500

* Single stack piers may be constructed up to 54" max. height only when installed as perimeter or marriage line support piers.

** Cross reference maximum allowable pier height with maximum floor height listed in frame tie down charts. If maximum height listed in frame tie down charts is exceeded then designs must be provided by a registered professional engineer or registered architect.



Install Footings

TABLE 10. FOOTING DIMENSIONS

Pier Capacity (lbs)	Soil Bearing Capacity (PSF)					
	Required Footing Area (square inches)					
	1000	1500	2000	2500	3000	4000
1000	144	128	128	128	128	128
1200	173	128	128	128	128	128
1400	202	134	128	128	128	128
1600	230	154	128	128	128	128
1800	259	173	130	128	128	128
2000	288	192	144	128	128	128
2200	317	211	158	128	128	128
2400	346	230	173	138	128	128
2600	374	250	187	150	128	128
2800	403	269	202	161	134	128
3000	432	288	216	173	144	128
3100	446	298	223	179	149	128
3200	461	307	230	184	154	128
3300	475	317	238	190	158	128
3400	490	326	245	196	163	128
3500	504	336	252	202	168	128
3600	518	346	259	207	173	130
3700	533	355	266	213	178	133
3800	547	365	274	219	182	137
3900	562	374	281	225	187	140
4000	576	384	288	230	192	144
4100	590	394	295	236	197	148
4200	605	403	302	242	202	151
4300	619	413	310	248	206	155
4400	634	422	317	253	211	158
4500	648	432	324	259	216	162
4600	662	442	331	265	221	166
4700	677	451	338	271	226	169
4800	691	461	346	276	230	173
4900	706	470	353	282	235	176
5000	720	480	360	288	240	180
5200	749	499	374	300	250	187
5400	778	518	389	311	259	194
5600	806	538	403	323	269	202
5800	835	557	418	334	278	209
6000	864	576	432	346	288	216
6200	893	595	446	357	298	223
6400	922	614	461	369	307	230
6600	950	634	475	380	317	238
6800	979	653	490	392	326	245
7000	1008	672	504	403	336	252
7200	1037	691	518	415	346	259
7400	1066	710	533	426	355	266
7600	1094	730	547	438	365	274
7800	1123	749	562	449	374	281
8000	1152	768	576	461	384	288
8500	1224	816	612	490	408	306
9000	1296	864	648	518	432	324
9500	1368	912	684	547	456	342
10000	1440	960	720	576	480	360
10500	1512	1008	756	605	504	378
11000	1584	1056	792	634	528	396
11500	1656	1104	828	662	552	414
12000	1728	1152	864	691	576	432
12500	1800	1200	900	720	600	450
13000	1872	1248	936	749	624	468
13500	1944	1296	972	778	648	486
14000	2016	1344	1008	806	672	504
14500	2088	1392	1044	835	696	522
15000	2160	1440	1080	864	720	540
15500	2232	1488	1116	893	744	558
16000	2304	1536	1152	922	768	576

Note:

To calculate a square or rectangular footer:

Length (in) x Width (in) = Area

Example:

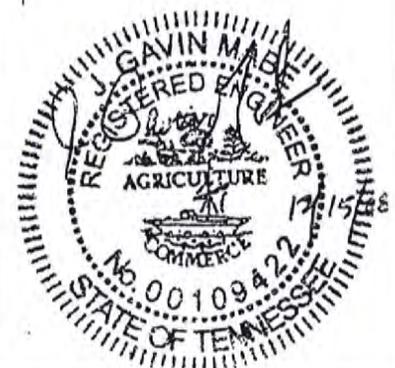
16 in x 20 in = 320 sq. inches

To calculate a round footer:

3.14 x .25 x Diameter (in) x Diameter (in) = Area

Example: For a 22" diameter footing

3.14 x .25 x 22 in x 22 in = 380 sq. inches



Design footings to comply with the following additional requirements:

- To keep footings directly under I-beams and other support points, size them slightly larger than the minimum required area to allow slight adjustment of the pier location during home installation.
- Design footings with a footing extension (projection beyond the base of the pier) no greater than the footing thickness (Figure 11). Increase footing thickness if necessary.

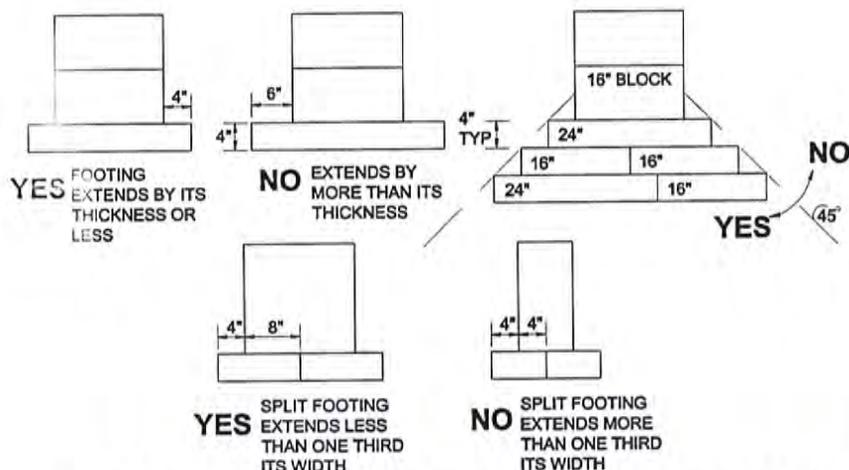


Figure 11. Maximum footing extensions

- The footing sizes shown are for square pads and are based on the surface area (square inches). Design non-square footings such that the area and depth is equal to or greater than the area of the square footing shown in Table 10 and the distance from the edge of the pier to the edge of the footing is not more than the thickness of the footing.

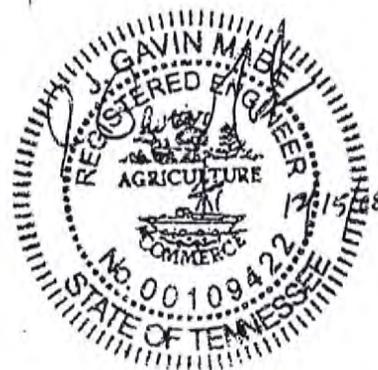
TABLE 10A. FOOTER DEPTH

Footing Depth (In)	Poured In Place Footing for Single Stack Pier		Poured In Place Footing for Double Stack Pier		
	Max Footer Dimension (In x In)	Max. Area (sq. in)	Footer Depth (In)	Max Footer Dimension (In x In)	Max. Area (sq. in)
6	28 x 20	560	6	28 x 28	784
8	32 x 24	768	8	32 x 32	1024
10	36 x 28	1008	10	36 x 36	1296
12	40 x 32	1280	12	40 x 40	1600
14			14	44 x 44	1936
16			16	48 x 48	2304

STEP 6. INSTALL FOOTINGS

Construct the footings as follows:

- Maintain the distance between adjacent piers to within 10% of the tabulated spacing and so the average distance between piers is equal to or less than the tabulated spacing.
- Whenever possible, place pier supports directly under the required locations. If plumbing, electrical or mechanical equipment interferes, place supports no more than 6 inches in either direction of the support point.
- Recess perimeter pier supports no more than 10 inches from the edge of the floor with added support as shown in Figure 12.



Placing Concrete anchors.

If anchors will be placed in concrete follow instructions in *Install Stabilizing System* (p. 74) to determine anchor layout. Either place anchors immediately after the concrete has been poured or drill them in after the concrete has set.

Install Footings

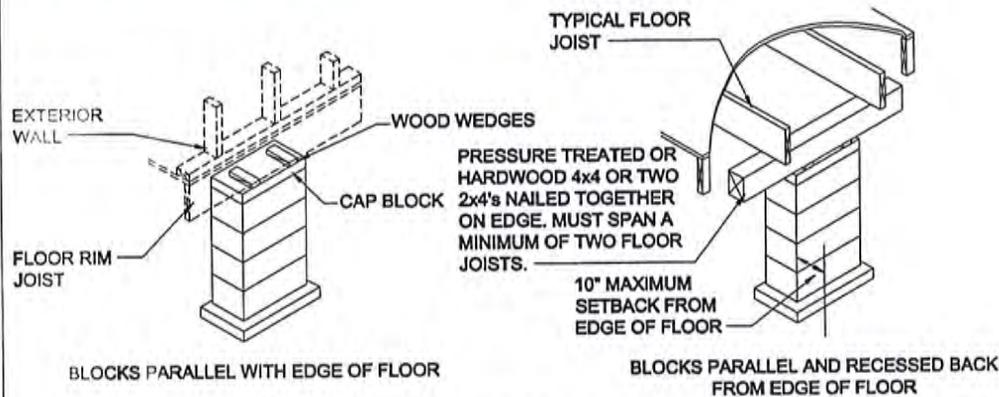


Figure 12. Perimeter supports

- If footings are rectangular, orient them so that the long side is perpendicular to the home's I-beam.
- Place the bottom of footings on undisturbed soil or fill compacted to at least 90% of its maximum relative density.
- In freezing climates protect footings from the effects of frost heave in accordance with any LAHJ requirements (see **Prepare the Site**, p. 15). Place the bottom of the footings below the frost line. Insulated foundations or other frost protection options are acceptable when designed by a registered engineer. Monolithic slabs are allowed above frost depth when designed by a registered engineer to resist the effects of frost heave. Anchorage requirements must be included with each registered engineer design when the anchorage requirements listed in this manual cannot be accommodated.
- Make sure the top surface of the footing is level, flat and smooth.



Excavation. If excavation is required, mark the footing locations on the ground with stakes before beginning to dig.

▶ go to **Set the Home** (p. 38)

Construct Foundation

(FOR HOMES WITH LOAD BEARING PERIMETER WALL)

This chapter provides guidelines and recommendations for the design and construction of a basement or crawlspace foundation using a load bearing perimeter wall. A load bearing perimeter wall foundation system uses a wall along the outer edge of the home to support the home's outside walls. This perimeter support works with interior supports such as piers, columns and cross beams that support the home's frame and, if multi-section, marriage line.

Follow the Steps below:

- ▼ STEP 1. OBTAIN A FOUNDATION DESIGN (p. 35)
- ▼ STEP 2. EXCAVATE (p. 35)
- ▼ STEP 3. CONSTRUCT THE FOOTING OR SLAB (p. 35)
- ▼ STEP 4. CONSTRUCT THE PERIMETER WALL (p. 35)
- ▼ STEP 5. INSTALL INTERIOR SUPPORTS (p. 37)
- ▼ STEP 6. WATERPROOF FOUNDATION WALL (p. 37)
- ▼ STEP 7. BACKFILL AND GRADE (p. 37)

STEP 1. OBTAIN A FOUNDATION DESIGN

If a load bearing perimeter wall foundation design has not been provided by the home manufacturer, it is the responsibility of the retailer and/or home owner to provide a design approved by an engineer or architect, licensed in the state where the home will be installed. The approved design must comply with the LAHJ regulations for foundation design, waterproofing and drainage, and the following:

- The foundation perimeter bearing wall must be supported with a concrete slab or continuous strip footing around the perimeter of the home. Interior piers must be supported by a slab or footings. If footings are used under interior piers, they may be designed as in **Design Frame and Perimeter Supports**, p. 25.
- Slabs must extend to the edges of the home. **IMPORTANT: Verify the dimensions of the actual floor width (eg. a 28' wide home does not measure 28 feet in width).**
- Footings and slabs must be protected from the effects of frost heave by extending the footings to or below the frost line or by using a frost protected shallow foundation design.

STEP 2. EXCAVATE

Excavate for the foundation, properly disposing of the earth that is not needed for backfill or site grading purposes.

STEP 3. CONSTRUCT THE FOOTINGS OR SLAB

Construct the foundation according to the approved design, including the perimeter foundation wall, drainage system, footing(s) and/or slab.

STEP 4. CONSTRUCT THE PERIMETER WALL

Unless the approved design requires otherwise, construct the perimeter wall with mortared and reinforced concrete blocks or reinforced poured-in-place concrete. Install reinforcement according to the approved design or LAHJ. Install ventilation and access openings according to the approved design, or if not specified, according to the requirements in **Complete Under the Home, STEP 3 INSTALL SKIRTING** (p. 113).



Using engineered designs.

This section is NOT intended to provide a complete design for a buildable foundation. A complete design must be obtained that is suitable for the local area and sealed by a professional engineer or registered architect, licensed in the state. Alternate foundation designs must be approved by the manufacturer and DAPIA. Prior to obtaining an alternative design contact the home building facility for available approved alternative designs or instructions for submitting an alternative design. The manufacturer is capable of providing limited model specific foundation designs upon request.

Foundation ready home.

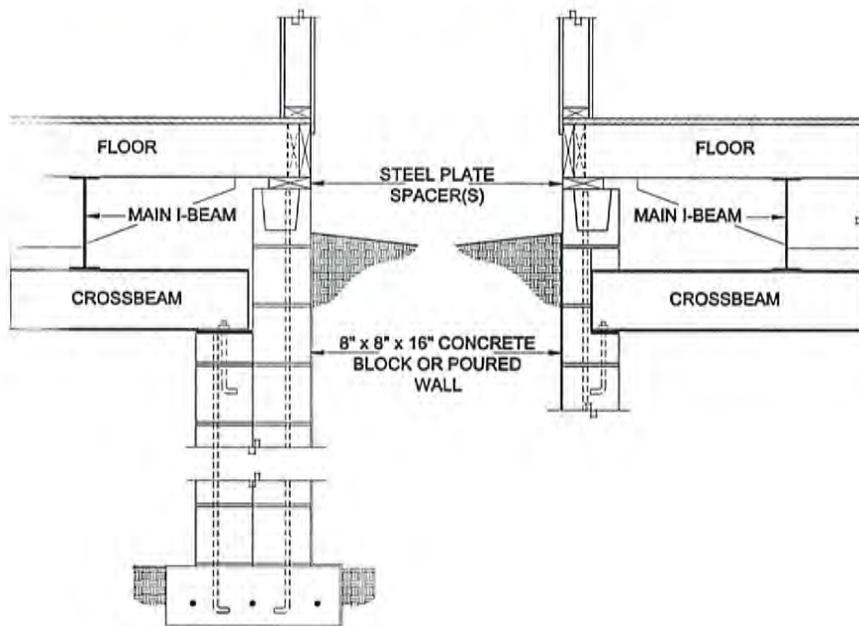
Make sure that homes to be installed on a basement or a crawlspace have been ordered with a recessed frame or as a basement-ready frame system, where the

Construct Foundation

When open slatted deck boards are used at recessed entries and porches, provisions must be made to ensure water is not permitted to drain into the area under the conditioned portion of the home. Any perimeter type skirting or foundation wall should be installed to follow the exterior of the wall of the home and permit the area beneath the skirting to drain water away from the home.

When constructing pockets for a cross beam system, measure the beam depth and locate the pockets carefully. It is critical that the home's frame rests on top of the cross beam and the perimeter of the floor rests squarely on the foundation wall sill plate (Figure 13). Leave room for a two-inch nominal, hardwood spacer on top of the wall pockets (to prevent corrosion, the steel beams must not be in direct contact with concrete). Leave at least one inch for thermal expansion at the ends of the beams and maintain a minimum of two inches of bearing area for the beams in the pockets (yielding a minimum pocket depth of three inches).

Bolt a pressure treated wood sill plate (minimum 2 x 6) to the top of the foundation wall. If the home's siding cannot be nailed through, use a 2 x 10 sill plate that extends into the foundation 1-1/4 inches (Figure 14). The home can then be connected to the foundation by fastening the sill plate into the floor joists from below. Connect the home to the foundation according to the approved design (See Step 1).



frame is designed to avoid interference with the foundation wall.

Checking the water table.

For basements, check for a high water table. The water table may vary seasonally or based on weather conditions. A geologist can perform an algae test to determine the water table level. The foundation design must account for a high water table.

Level the wall. Make sure the foundation is level and straight with no more than a 1/4 inch vertical variation over the entire foundation and no more than 1/8 inch vertical variation over any two-foot length.

Check for Plates. When using a cross beam system, check and compensate for reinforcement plates that add thickness to the chassis beam at axle locations.

Figure 13. Cross beam installation

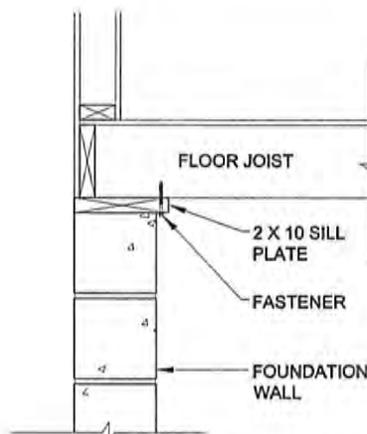


Figure 14. Connection using 2 x 10 sill plate

STEP 5. INSTALL INTERIOR SUPPORTS

Install piers, columns and cross beams to support the interior of the home according to the approved design.

STEP 6. DAMP PROOF FOUNDATION WALL

Damp or water proof foundation walls as necessary according to local jurisdiction requirements.

Is this a basement foundation?

- ▶ YES, go to *Set the Home*, (p. 38).
- ▶ NO, go to **STEP 7. BACKFILL AND GRADE**, (p. 37)

STEP 7. BACKFILL AND GRADE

Backfill against the foundation wall to the height of the damp proofing. Take care to not damage the drainage system. Grade the fill as per **Prepare the Site** (p. 15).

Does the approved foundation design call for ground anchors?

- ▶ YES, go to *Install Stabilizing Systems*, (p. 74).
- ▶ NO, go to *Set the Home*, (p. 38).

Footing heights. Pour footings to a height that will reduce the need to cut blocks or shim when building perimeter walls and piers.



Backfilling. Backfill against basement walls only after the home is connected to the foundation or the basement walls may deflect inward or collapse.

Set the Home

This chapter describes the process of installing the first section of the home (for single section homes this is the only section) onto the foundation.

Follow the Steps below:

- ▼ STEP 1. PREPARE FOR SET (p. 38)
- ▼ STEP 2. POSITION HOME SECTION (p. 38)
- ▼ STEP 3. LIFT HOME (p. 38)
- ▼ STEP 4. CONSTRUCT PIERS (p. 40)

STEP 1. PREPARE FOR SET

Before beginning the home set, complete the following:

- Confirm that the site is properly cleared and graded (see **Prepare the Site**, p. 15).
- Ensure that the footings are in place and properly located.
- Install any utilities that will be difficult to install (e.g. those below grade beneath the home) after the home is in place.
- Secure or remove from the home and properly store all ship loose items (refer to shipping documents for items shipped with the home).
- Inspect the home interior, exterior and all provided materials, appliances and equipment. Immediately report any damage or shortages to the manufacturer.

For perimeter bearing wall foundations:

- Check that the actual length and width of the home matches the foundation walls.
- Check that the two main diagonal measurements of the foundation are equal.
- Check that the foundation walls and other support points are within 1/4 inch of level overall and within 1/8 inch of level within any four foot distance.
- For multi-section homes, check that each pair of diagonal measurements for each portion of the foundation corresponding to a home section are equal.
- For multi-section homes, find the electrical bonding lugs on the front or rear outriggers. Reverse them to the inside of the outrigger so they will be accessible after the home is placed on the foundation walls.
- If using a cross beam system, remove the frame's shackle hanger if it will interfere with proper placement of the beam.

STEP 2. POSITION HOME SECTION

Position the home section in its final location (if possible, move the heaviest section of the home into place first). Then place materials needed to construct support piers near their final locations under the home as determined in **Install Footings**, (p. 20).

STEP 3. LIFT HOME

There are three primary methods available to place the home on the foundation: jacking, rolling and craning. Jacks, often with roller systems, are typically used for pier and anchor foundations; roller systems are commonly used for crawlspace foundations with load bearing perimeter walls; and cranes are most commonly used for basement foundations.

JACKS

If jacks are to be used, comply with all jacking safety precautions and the procedure below. Lifting the home with jacks involves potential risks and must be done with ut-



Clearances under the home. After the home is leveled, the resulting distance between the bottom of the entire chassis main frame beam and the ground must be no less than 12 inches.

Utilize proper cribbing. Homes weigh several tons. No one should be under the home (whether it is moving or stationary) unless proper cribbing is in place (**Figure 15**). Failure to utilize proper cribbing may result in serious injury or death.



Leveling During Jacking. Keep the home's floor as level as possible during jacking. Twisting or warping the floor can damage the structure and finishing. Use as many jacks as necessary to keep the floor flat and level.

most care and caution. Failure to follow jacking warnings and procedures may result in serious injury or death. Please read the Jacking Safety Precautions before lifting the home with jacks.

JACKING SAFETY PRECAUTIONS

- No one should be under the home's I-beams while the jacks are being operated or while the home is supported only on the jacks.
- Use jacks only for raising the home. Do not rely on the jacks to support the home.
- If possible, raise the home only on one side so that the other side is in contact with the ground. Leave the hitch connected to the vehicle or other stabilizing equipment.
- Obey all OSHA regulations.
- Make sure adequate safety cribbing (**Figure 15**) is in place whenever the home is placed on jacks.
- Use a minimum of two commercial quality jacks, each with a rating of at least 12 tons.
- Jack only on the main chassis I-beam, centering jacks directly under the beam.
- Do not jack on a seam (joint between flanges of twin I-beams).
- To distribute the concentrated loads from jacks to I-beam, place a minimum 3/8-inch thick steel plate, a C-channel, a 1½-inch thick hardwood block or a commercial jacking plate, between the main chassis I-beam and the jack head.
- Locate the jack base on firm ground. Never jack on freshly disturbed soil or where an underground sewer pipe may be located.
- Use a firm support under the jack base to prevent tipping or settling of the jack. A minimum 16" x 16" or larger wood or rigid fiberglass pad is recommended. Never use concrete blocks as a support for a jack.
- Never use jacks that are leaking or are in need of repair.

Follow the jacking sequence outlined below to avoid overstressing structural members:

1. **Block wheels.** Block the wheels so the house does not roll.
2. **Install cribbing.** Install safety cribbing (**Figure 15**)

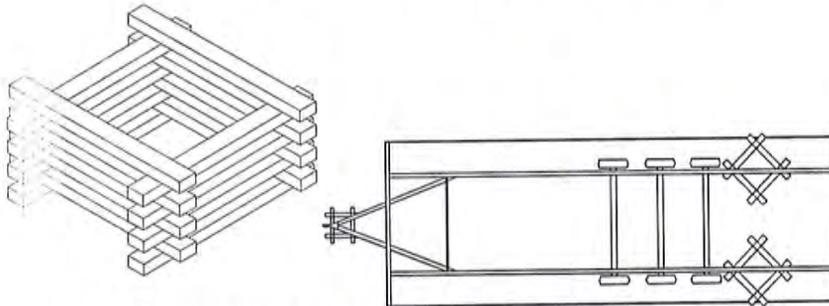


Figure 15. Stack 4" x 6" by 5' long timbers as shown to form safety timbers. Place safety timbers under home behind axle area and under hitch.

3. **Level lengthwise.** Locate one jack at the hitch and level the section lengthwise (such that the front and rear of the section are at the same height).
4. **Locate frame jacks.** Place a minimum of one jack in front of the first spring hanger and another just behind the last spring hanger of the I-beam on the side of the home that is lowest (making sure not to place jacks where the piers will go). Place jacks no more than 20 feet apart and no more than 20 feet from each end of the I-beam.
5. **Lift the home.** Operating the jacks simultaneously (or sequentially in very small increments), lift the home section until it is slightly higher than the final desired pier height.

Set the Home

ROLLER SYSTEMS

When using a roller system, comply with the equipment manufacturer's directions and the following sequence:

1. **Establish staging area.** Establish a staging area directly adjacent to one or both sides of the foundation.
2. **Setup rollers.** Set up the roller system according to the equipment manufacturer's directions.
3. **Fasten bump blocks.** Temporarily fasten wooden bump blocks on the sill plates at the ends of the foundation to stop the home from rolling at the desired location.
4. **Roll home.** Roll the home into place over the foundation.
5. **Remove bump blocks.** Remove the blocks before installing the next section of a multi-section home.

CRANES

When using a crane, follow these guidelines:

- Position the home section(s) and crane (taking the boom reach into consideration) such that they do not have to be repositioned during the set.
- Use enough properly sized straps to maintain balance of the home and to prevent damage to the structure.
- Place straps under walls or posts, including temporary posts used to support the opening. Do not position lifting straps under marriage wall openings.
- Use a properly sized spreader bar to maintain a vertical lift, to avoid placing compression forces on the eaves and to reduce any tendency to slip.
- Connect a rope to at least one point on the home so it can be controlled while aloft.
- Make provisions to retrieve the straps/cables after the home is set. If using a cradle system, notch the sill plate where the straps will fall. For a sling system, notch and reinforce the home's rim joist to keep the strap from slipping and allow the strap to be removed after the home is set.
- Always set the home section farthest from the crane first so that subsequent section(s) need not be lifted over previously set sections.

Have the interior foundation supports already been designed and installed as part of an approved load bearing perimeter wall foundation?

- ▶ **YES, go to Complete Multi-Section Set, (p. 44) or go to Connect Utilities, (p. 95) for single section homes.**
- ▶ **NO, go to STEP 4. CONSTRUCT PIERS, (p. 40).**

STEP 4. CONSTRUCT PIERS

For the side of the home section that is up on jacks, place piers on footings or pads following the home manufacturer's blocking plan (or tags). If no plan was provided, use the support plan developed in **Install Footings** (p. 20). Start at one end of the home section and work toward the other noting the required pier material specifications and procedure described below.

Construct piers so as to provide a stable foundation for the home using materials listed in the specifications box below and based on the location of the pier and its height as measured from the top of the footing, pad or grade to the top of the cap. The pier height can be measured from the lowest surrounding grade to the top of the cap when grade level is above the top of the footing. See **Table 12** for pier construction requirements.



No one should be under the home while it is suspended. Never put your hands between the home and the perimeter walls.



Designing piers. Incorrect size, location or spacing of piers may result in serious structural damage to the home. Install piers at all required locations. Failure to do so may lead to sagging floors, walls and roofs, and could void the home's warranty.

TABLE 11. PIER MATERIAL MINIMUM SPECIFICATIONS

Component	Specification
Concrete Block	Nominal dimensions of at least 8" x 8" x 16"; confirming to ASTM designation C90, grade N
Caps	Solid masonry (nominal 4" x 8" x 16" pre-cast concrete without reinforcement); lumber (nominal 2" x 8" x 16"); or steel (minimum 1/2" thick, corrosion protected by a min. of a 10 mil coating of an exterior paint or equivalent)
Spacers	Nominal 2" thick hardwood boards or nominal 2" or 4" thick concrete blocks.
Shims (also called wedges)	When required, nominal 4-inch by 6-inch by 1-inch (max. vertical height) wood shims used in pairs. Some states, counties, townships, and or municipalities may require the use of hardwood or treated lumber shims. Other listed shims may be used if installed in accordance with the listing (max load capacity).
Commercial metal or pre-cast concrete piers	Available in various sizes stamped with maximum load capacity and listed or labeled for the required vertical load capacity, and, where required by design, for the appropriate horizontal load capacity. Metal or other manufactured piers must be provided with protection against weather deterioration and corrosion at least equivalent to that provided by a coating of zinc on steel of .30 oz per sq. ft of surface coated. Manufactured pier heights must be selected so that the adjustable risers do not extend more than 2 inches.
Pressure treated wood	With a water borne preservative, in accordance with AWPA Standard U1-04 for Use Category 4B ground contact applications

TABLE 12. PIER CONSTRUCTION

Location	Height	Configuration	Maximum offset top to bottom	Maximum Load (lbs)	
				Without Mortar	With Mortar
Frame	Less than 36 in *	Single stack blocks with long side perpendicular to frame I-beam	1/2"	5,760	7,680
	Between 36 in and 67 in	Double, interlocked blocks	1"	11,520 lbs.	15,360
	Between 36 in and 67 in	Triple, interlocked blocks	1"	17,280 lbs.	23,034
	Between 68 in and 108 in	Double, interlocked, reinforced blocks	1"	NA	39,500
Perimeter	54 in or less **	Single stack blocks with long side parallel to perimeter rail (rim joist)	1/2"	5,760	7,680
Marriage line	54 in or less**	Single stack blocks with long side perpendicular to the marriage line	1/2"	5,760	7,680

* Single stack piers may be constructed up to 54" max. height only when installed as perimeter and marriage line support piers.

** Cross reference maximum allowable pier height with maximum allowable floor height listed in frame tiedown charts. If maximum height listed in frame tiedown charts is exceeded then designs must be provided by a registered professional engineer or registered architect.

Maximum horizontal offset of 1/2" allowed for pier heights up to 36" and a 1" offset allowed for pier heights between 36" and 67".

- 1. Prepare footing surface.** Make sure the footing surface upon which the pier sits is flat and smooth. Before placing the pier on the footing, clean dirt, rocks or other material off the surface of the footing. If the footing surface is uneven, create a level, flat surface by placing a treated board on the footing and mortaring on the first block (or manufactured pier base), or by placing the first block (or manufactured pier base) on a layer of premix dry sand mortar.
- 2. Stack blocks.** Stack concrete blocks with their hollow cells aligned vertically. When piers are constructed of blocks stacked side-by-side, orient each layer at right angles to the previous one (**Figure 16**) and plan blocks so that split caps will be perpendicular to the blocks they rest on and perpendicular to the main I-beam.



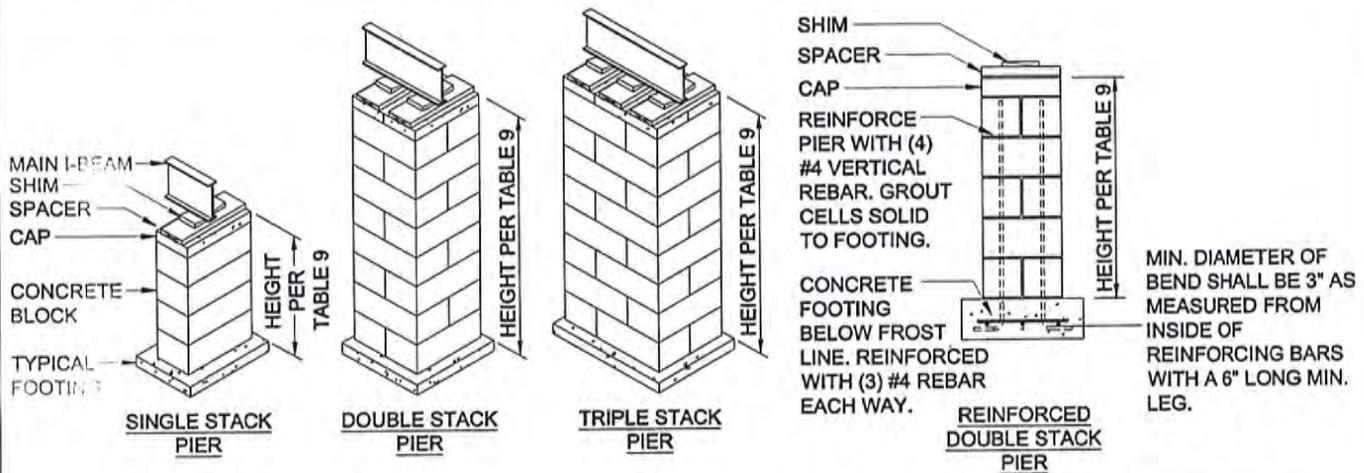


Figure 16. Frame pier construction.

3. **Cap piers.** Place a cap on hollow block piers to evenly distribute the structural load. Use caps the same length and width as the piers they rest upon. When using split caps on double-stacked block piers, install the caps with the long dimension perpendicular to the joint in the blocks below and perpendicular to the main I-beam.
4. **Install shims.** Use shims to level the home and fill any gaps between the base of the I-beam and the top of the pier cap. When required, always use shims in pairs (Figure 17). Drive them in tightly so they do not occupy more than one inch of vertical space. When the space to be shimmed is greater than one inch and less than the minimum thickness of available caps or concrete blocks, use hardwood dimensional lumber (two inches maximum thickness) or 4" thick concrete block. For split caps, install shims and dimensional lumber/blocks over each individual cap. Two cap blocks may be used as the cap on double block piers provided the joint between the cap blocks is perpendicular to the joint between the open cell concrete blocks and is also perpendicular to the I-beam supported by the pier.



Curing time of mortar.

Where wet mortar is used to construct or level piers, allowed it to cure to at least 80% of strength capacity (usually requiring 96 hours) before setting the home.

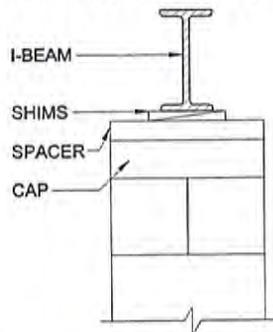


Figure 17. Correct shim placement

5. **Set up level.** Set up a water level with the fluid level at the desired height of the main piers. Carefully lower the side of the section down onto the leveled piers, adjusting the final height with shims.

USING A WATER LEVEL

A water level is a standard device for leveling the home. The level consists of the following components:

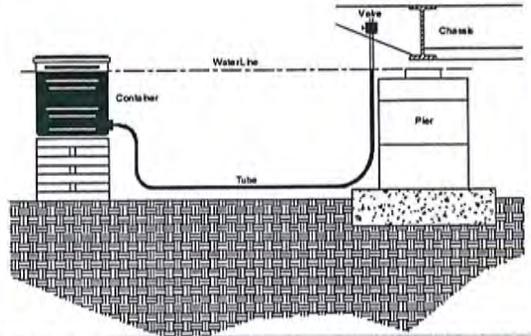
- One container (five gallon bucket or one gallon jug).
- 150 feet of 1/2 inch diameter clear plastic tubing.
- Fittings for container to tubing.
- Valve for terminal end of tubing.
- Liquid for system: colored water in warm climates, windshield washing fluid in cold climates.



Dimensions of masonry perimeter walls. If using a masonry perimeter enclosure, calculate pier heights so that the enclosure can be built using standard unit dimensions (without cutting).



Level the home. The home is adequately leveled if there is no more than 1/4 inch difference between adjacent pier supports (frame or perimeter) and the exterior doors and windows of the home do



How to use a water level

- a. **Position level.** Position the level such that it can reach all piers.
 - b. **Place container.** Place the container so that the fluid in the container is at the same level as the desired level of the top of the supports under the home, allowing for any bracing below the level of the I-beams.
 - c. **Uncoil tubing.** Uncoil the tubing and fill with fluid, taking care not to introduce bubbles into the hose. Never allow anything to crimp or crush the tubing so as to impede the free flow of fluid.
 - d. **Bleed air.** Hold the valve below the level of the water container; open the valve to bleed out any air and close the valve.
 - e. **Establish height.** Locate the tubing adjacent to a pier that is set to the desired final height. Position the valve above the pier and open the valve. Move the water container up or down to where the water level is at the desired final height of the pier. Maintain the water container in that position and close the valve.
 - f. **Level piers.** Move the tubing to the next pier. Hold the valve above the pier and open it. Set the pier height to the level of the water in the tubing and close the valve. Repeat this step until all piers are at the same level.
 - g. **Note:** If water leaks out of the system while in use, you must reposition the reservoir and begin the process again.
6. **Complete the opposite side.** Jack the other side of the section up and install piers following the instructions above. At the completion of this step, the section should be level from front to rear and from side to side.
 7. **Install perimeter and marriage line piers.** Install perimeter piers and for multi-section homes, marriage line piers. Position marriage line piers to provide equal bearing for both mating sections.
 8. **Remove running gear.** Remove and store, recycle or properly dispose of the hitch, axles and wheels. These items are the property of the homeowner unless other contractual arrangements have been made.

Is this a single-section home?

- ▶ **YES, go to Connect Utilities, (p. 95).**
- ▶ **NO, go to Complete Multi-Section Set, (p. 44).**

not bind and can be properly operated. If differences in pier heights occur, drain lines should be inspected to correct reverse slope situations.

Water level operation. To operate the water level properly, both ends of the system must be open to the atmosphere and there must be approximately the same amount of fluid in the tubing at all times (within a few inches).

Complete Multi-Section Set

This chapter covers the preparation and installation of additional home sections, including the structural connections between units, raising and fastening hinged roofs and fastening the home to a load bearing perimeter wall foundation.

Follow the Steps below:

- ▼ STEP 1. INSTALL MARRIAGE LINE ANCHORS (p. 44)
- ▼ STEP 2. REMOVE PROTECTIVE SHIPPING MATERIALS (p. 44)
- ▼ STEP 3. COMPLETE HINGED ROOF (p. 44)
- ▼ STEP 4. REPAIR OR INSTALL MARRIAGE LINE GASKET (p. 45)
- ▼ STEP 5. POSITION ADDITIONAL HOME SECTIONS (p. 45)
- ▼ STEP 6. CONNECT FLOORS
- ▼ STEP 7. CONNECT ROOF
- ▼ STEP 8. CONNECT WALLS
- ▼ STEP 9. ATTACH TAG UNITS (p. 54)
- ▼ STEP 10. REMOVE TEMPORARY ITEMS (p. 55)
- ▼ STEP 11. FASTEN HOME TO FOUNDATION (p. 55)
- ▼ STEP 12. BACKFILL AND GRADE (p. 55)
- ▼ STEP 13. BUILD STAIRS (p. 55)

STEP 1. INSTALL MARRIAGE LINE ANCHORS

If the home is in Wind Zone II or III, install ground anchors along the marriage line now; before mating sections are joined see **Install Stabilizing System** (p. 74). After installing marriage line anchors return to this point in **Complete Multi-Section Set**.

STEP 2. REMOVE PROTECTIVE SHIPPING MATERIALS

Remove all shipping protection and associated fasteners from both home sections to be joined, including plastic used to close up the open sides during transportation. Do not remove the temporary supports holding up the ceilings at major openings. Wind wrap (such as Tyvek or other similar product) will be installed over the exterior wall OSB sheathing and under the shipping plastic. Be careful not to damage the wind wrap when removing the shipping plastic.

STEP 3. COMPLETE HINGED ROOF

If the home has a hinged roof that has been folded down for shipping, refer to **Appendix D** for hinged truss installation information.

Checklists for alternate construction. If the serial number (see the data plate or the chassis front cross member) has the letters "AC" before or after it, then the Alternate Construction on-site check list supplied with the home must be completed and returned to the home manufacturer in a timely manner. If the AC checklist relates to the roof, then failure to do so may require future disassembly of the roof and further inspections.

STEP 4. REPAIR OR INSTALL MARRIAGE LINE GASKET

A continuous, non-porous gasket creating a permanent air barrier will be installed on at least one side of the marriage line; along the floor, end walls and ceiling (and marriage lines for any tag units). The manufacturer has provided a marriage line gasket either installed on the home or shipped loose. If installed, inspect the gasket and repair any gaps or tears.

If not installed at the factory, install a continuous gasket between the home sections along the floor, end walls and ceiling.

For homes with through-the-rim crossover ducts (see **Connect Crossovers**, p.61) inspect and if necessary, repair gaskets around the rim joist duct openings using 3/4 inch thick fiberglass duct board or other material acceptable to the manufacturer. Ensure that duct openings are unobstructed.

STEP 5. POSITION ADDITIONAL HOME SECTIONS

Follow this procedure to install additional home sections:

1. **Remove obstructions.** Remove protruding nails and staples or anything else that will keep the home sections from fitting together snugly. If present, cut the temporary ceiling and floor plates at the edges of marriage line openings taking care not to damage ceiling or floor coverings or displace temporary marriage line support posts (these supports and the plates will be removed after the home sections have been structurally connected).
2. **Complete crossovers.** Before moving the two sections together, complete any crossover connections that require access from the open marriage line, including the attic duct connection (if present) and marriage wall interior electrical connections (see **Connect Crossovers**, p.61).
3. **Position section.** Position the section as closely as possible (ideally within six inches) and line up with the previously set section. If using a mechanical positioning system or crane, follow the system manufacturer's instructions or the crane operator's directions.
4. **Construct piers.** With the outside walls of the home aligned, construct the piers for the home section according to the instructions in **Set the Home** (p.38) before continuing to the steps below.
5. **Level section.** Lower the section onto the outside piers first, inside piers last. Before releasing the mechanical positioning system, check interior doorways and other openings for misalignments that may cause problems during trim-out. The floors should be flush, level and tight and the roof section should have little, if any, gap at the top of the marriage line. Use at least two come-alongs to pull the sections snugly together and use the water level or other leveling device to set all piers and shims.
6. **Shim gaps.** Shim any gaps up to one inch between structural elements with dimensional lumber. If any gaps exceed one inch, re-position the home to eliminate such gaps.

STEP 6. CONNECT FLOORS

Make floor structural connections according to the appropriate method described below. A sealing gasket shall be present between marriage line rim joists.

Alternate 1: Toed fasteners through bottom board

Make connections according to the fastener specifications in **Table 13** and **Figure 18**. Fasteners on each side of marriage line shall be staggered and offset by twice the spacing distance (**Figure 18A**). Repair any tears or holes in the bottom board after installation of fasteners.



Checking through-the-rim-ducts. Ensure that through-the-rim-duct connections are secure and tight after the home sections are together.



Mechanical positioning system. For a pier-set home, a mechanical positioning system (such as a roller system) will make the process easier and safer and be less likely to damage the home.



Safety. Remember to place safety timbers under home behind axle area and under hitch.



Sealing gaps. Prior to completion of the exterior close-up, gaps that do not exceed one inch are permitted between structural elements provided that the gaps are closed before completion of close-up, the home sections are in contact with each other; and the marriage gasket provides a proper seal.

TABLE 13. FLOOR CONNECTION FASTENING SPECIFICATIONS

Fastener Type	Fastener Size	Spacing		
		Wind Zone 1	Wind Zone 2	Wind Zone 3
Lag screw	3/8" x 3-1/2"-6-1/2"	24 in.	24 in.	24 in.

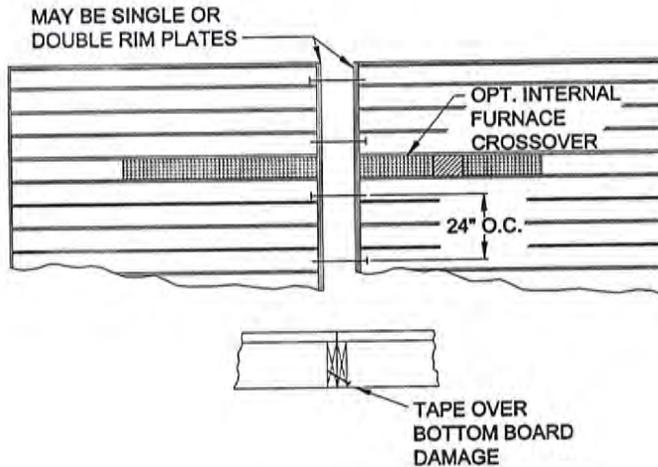


Figure 18. Floor connection through bottom board

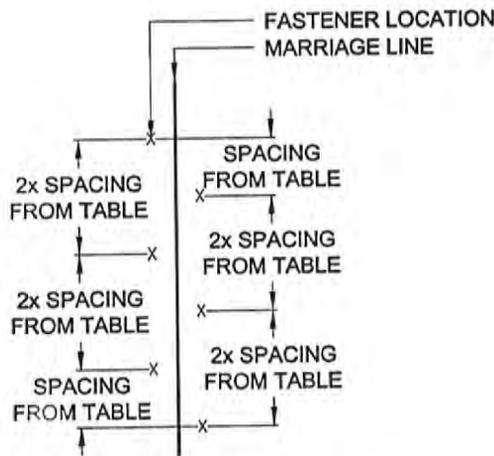
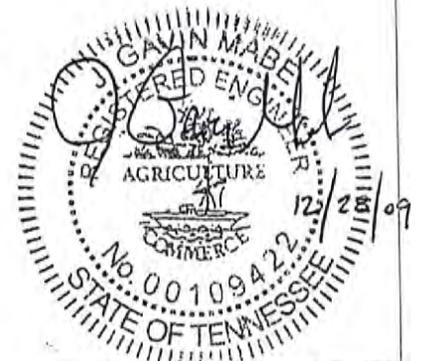


Figure 18A. Staggered offset fastening along marriage line

Additional fastening requirements:

- Wind Zones 2 and 3 require metal strap per specifications below.
- Fasteners to be installed at approximately a 45 degree angle from horizontal.
- Two additional fasteners are required at each end of the home.
- One additional fastener is required at each side of through-the-rim crossover duct openings.
- Increase fastener length by three inches for double rim joists.
- Lags to include washer.



Metal strap and fastening specifications (required for Wind Zones 2 and 3):

- Strap to be min 26ga 1-1/2" wide galvanized steel strap spaced per **Table 13A** and **Table 13B**. Strap length shall be sufficient to hold the required fasteners (**Figure 18B**).

TABLE 13A. MAXIMUM STRAP SPACING

Strap	Wind Zone	
	Wind Zone 2	Wind Zone 3
26 ga. x 1-1/2"	32 in.	32 in.
26 ga. x 2"	48 in.	48 in.

TABLE 13B. STRAP FASTENING MINIMUM SPECIFICATIONS

Strap	Fastener	Number
26 ga. x 1-1/2"	3/8" x 3-1/2" Lag Screw	1 each side
26 ga. x 2"	3/8" x 3-1/2" Lag Screw	2 each side

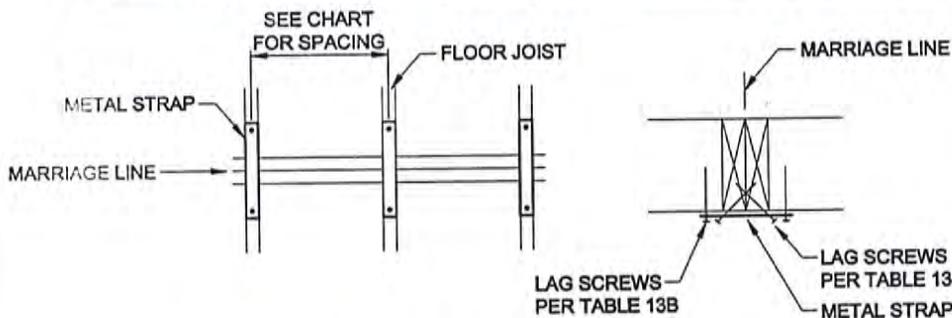


Figure 18B. Strapping at marriage line floor connection

STEP 7. CONNECT WALLS

Make wall structural connections according to the appropriate method described below.

Bolt or lag end studs behind sheathing

Make connections by installing fasteners in the end wall (**Figure 19**) according to the fastener specifications and spacing requirements in **Table 14**, and the following requirements:

- For bolts, predrill holes and use washers both sides and nuts.
- After the walls have been connected, install the exterior wall sheathing panels if they were shipped loose. Install shipped loose sheathing using min 15ga x 7/16" x 1-1/2" staples or 6d nails spaced 2 inches o.c for OSB and 3 inches o.c. for other exterior materials to all horizontal and vertical framing members.

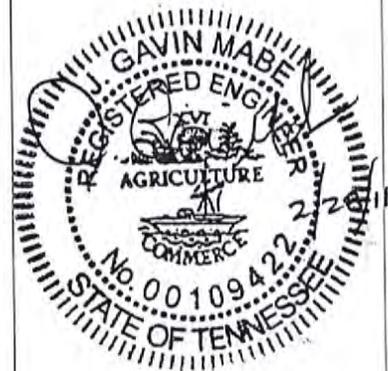
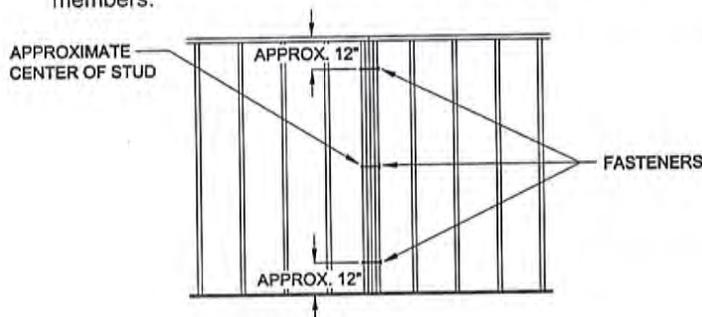


Figure 19. Endwall connection

TABLE 14. END WALL CONNECTION SPECIFICATIONS – FROM BEHIND SHEATHING

Fastener type	Size	Locations
Lag screw	3/8" x 6"	Top, center, bottom
Bolt	3/8" x 7" or 1/2" x 7"	Top, center, bottom

STEP 8. CONNECT ROOF

MULTI SECTION HOME RIDGE LINE

Make roof structural connections according to the appropriate method described below. If the home has a hinged roof, see also the section on hinge roof raising and fastening.

Standard Ridge Bolts

Install a 1/2" bolt, (2) 15/16" washers and nuts in all pre-drilled holes in the ridge beam. Bolts, washers and nuts will be provided by the manufacturer. Single bolt holes will be pre-drilled by the manufacturer at intervals of 12" to 48" along the length of the ridge beam.

Wind Zone II & III Requirements (Also a requirement in Wind Zone I when the roof decking is the diaphragm)

Additional straps and screws are required as shown on the following page (Figure 20). These straps and screws are in addition to the bolts discussed above.



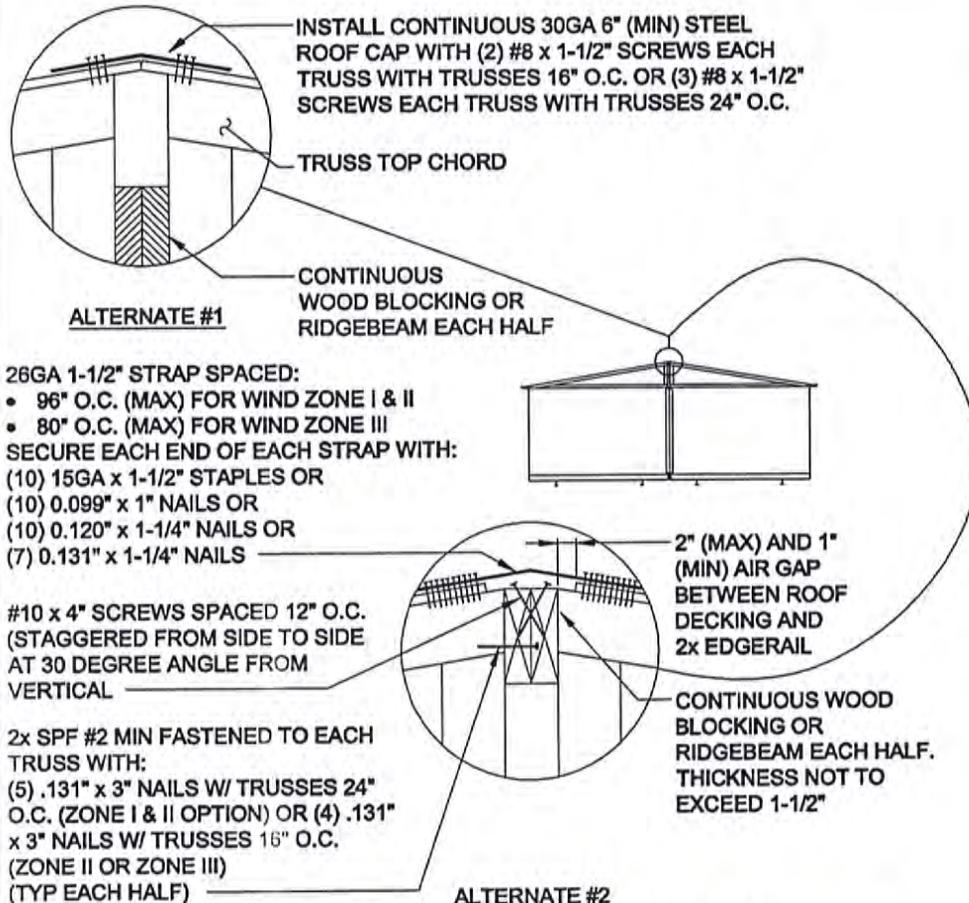
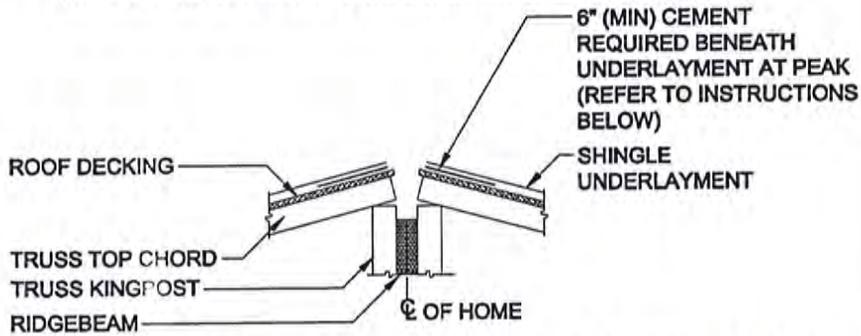


Figure 20. Roof connection- Alternate #2 must be used with Ridge Vents

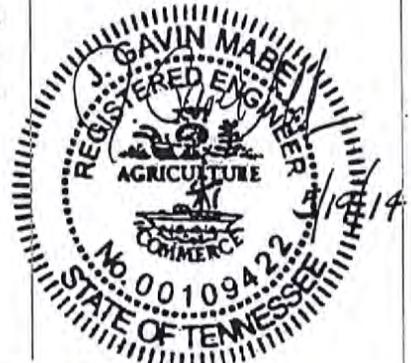
**WIND ZONE II AND III ROOF CONNECTIONS
(USE IN WIND ZONE I WHEN ROOF DECKING IS THE DIAPHRAGM)**



INSTRUCTIONS:

1. THE TEMPORARY PIECE OF DECKING MATERIAL IS TO BE REMOVED ALONG THE RIDGE OF HOME TO ALLOW THE INSTALLATION OF THE RIDGE BEAM CONNECTING BOLTS.
2. AFTER RIDGEBEAM BOLTS HAVE BEEN INSTALLED, SECURE DECKING MATERIAL BACK IN PLACE WITH 15GA 1-1/2" STAPLES 2-1/2" O.C. INTO TRUSS TOP CHORDS OR 8D NAILS 2-1/2" O.C. INTO TRUSS TOP CHORDS.
3. BEFORE INSTALLING SHINGLES AT RIDGE PEAK, YOU MUST CEMENT THE UNDERLAYMENT TO THE ROOF DECKING WITH 6" (MIN) CEMENT STRIP ALONG THE PEAK OF THE ROOF ON BOTH HALVES OF THE HOME.
4. SHINGLES MAY THEN BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.

SHINGLE UNDERLAYMENT AND CEMENT APPLICATION AT ROOF PEAK



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GENERAL APPLICATION

Application ref 77399 Fee Effective Dt 06/19/2015
 Department INSPECTION SERVICE
 Location 914 VARNUM AVE
 Parcel TEMP-B03045-1

Cross streets
 Add'l loc desc
 Municipality
 Subdivision
 Existing use
 Lot

LOWELL

Current Zoning
 Flood zone
 Applicant
 Proj/Activity
 Class of work
 Description

GENERAL CONTRACTOR
 NEW SINGLE FAMILY
 NEW CONSTRUCTION
 NEW MODULAR HOME 14' X 62' WITH FARMERS PORCH

Proposed use
 memo
 Proposed zoning
 Flood zone
 Non-conforming
 Applic received
 Estimated cost
 Actual start/end
 Impervious Surf

Assigned to
 Status
 Status code desc
 Next action
 memo

ACTIVE
 NEW APPLICATION
 Multiple submissions N
 Government owned N

Ordinance ref
 Reason for app
 Parent app

PRK RES PARKING SIGN NUMBER

ROLES/NAMES

Role	Name/Address	Lic Type	License number	Class	NAICS	Expires
OWNER	OWNER UNKNOWN					
CID : 11111	LOWELL, MA 01852					
GENERAL CONTRACTOR	DOWLING, JOHN F.					
CID : 732218	75 DUNBAR AVE					
Phone: 978-479-2411	LOWELL, MA 01854					
Tradesman Name						
JOHN F DOWLING		CLIC	032079			12/03/15



AS EVIDENCED BY THIS LABEL NO.

NTA1682820

THE MANUFACTURER CERTIFIES TO THE BEST OF THE MANUFACTURER'S KNOWLEDGE AND BELIEF THAT THIS MANUFACTURED HOME HAS BEEN INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT AND IS CONSTRUCTED IN CONFORMANCE WITH THE FEDERAL MANUFACTURED HOME CONSTRUCTION AND SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE. SEE DATA PLATE.



Colorado State Modular Code Label

What is a mobile home?

A mobile home is a factory-built home that is 1) built before June 15, 1976, and 2) not built to a uniform construction code.

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Manufactured and modular homes can be very similar in appearance. Although many people use the terms interchangeably, the code the home is built to can have an effect on the location the home is placed, the finance options, the tax implications, etc.

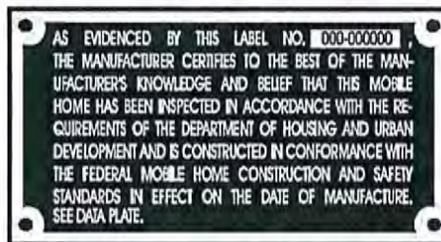
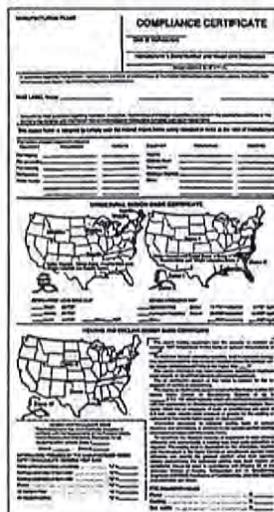
What is a manufactured home?

Home Value Report

A manufactured home is any home factory-built in the U.S. to the HUD Title 6 construction standards (commonly known as 'the HUD-code'). The HUD-code took effect June 15, 1976.

A HUD-coded home will display documentation called the Certification Label and the Data Plate. The red Certification Label (sometimes called the HUD Label) can be located on the tail end of each transportable section of the home. The Data Plate will be located inside of the home. Regulation states that the Data Plate be affixed inside the home on or near the main electrical breaker box, or other readily visible/accessible location. These documents are extremely important; as per the HUD Title 6 regulation removal is illegal. Removal could hinder the buying, selling, financing, or insuring of a manufactured home; they are not replaceable.

A manufactured home is built on a permanent chassis to ensure transportability. However, typically a manufactured home is not moved from its initial installed site.



What is a modular home?

A modular home is any home factory-built to a local state code. In some cases, a state may have adopted one of the uniform construction codes (i.e. UBC, IRC, etc.).

Modular homes will not have the red Certification Label, but will have a label attached to the home stating the code it was built to. The appropriate [State Modular Code Agency](#) will be able to assist you in locating the modular label.

A modular home can be built as an "on-frame" or "off-frame" modular. On-frame will be built on a permanent chassis, whereas, the off-frame modular will be built with removal of the chassis frame in mind. An off-frame modular will usually require additional cranes to assist with home placement. Modular homes are, more often than not, attached to private land.