

**1018 SOLAR BALANCE POINT/INFILL**

---

1018.01 PURPOSE

Section 1018 is adopted to promote the use of solar energy, to minimize the shading of structures by structures and accessory structures, and, where applicable, to minimize the shading of structures by trees.

1018.02 APPLICABILITY

Section 1018 applies to an application for a building permit for all structures in VR-4/5, VR-5/7, R-7, R-8.5, R-10, R-15, R-20, and R-30 Districts and all detached single-family dwellings in any zoning district, except to the extent that one or more of the conditions listed in Subsections 1018.06 and 1018.07 exists, and exemptions or adjustments provided for therein are warranted. In addition, nonexempt vegetation planted on lots subject to Subsection 1017.07 shall comply with the shade point height standards as provided in Subsections 1018.05 and 1018.06. In addition, Subsection 1018.11 shall apply to development in the HDR, SHD, and RCHDR Districts.

1018.03 DEFINITIONS

Words and terms used in Section 1018 shall be as defined under Subsection 1017.03.

1018.04 SOLAR SITE PLAN REQUIRED

An applicant for a building permit for a structure subject to Section 1018 shall submit a site plan that shows the maximum shade point height allowed under Subsection 1018.05 and the allowed shade on the proposed structure's solar features as provided in Subsection 1018.08. If applicable, the site plan also shall show the solar balance point for the structure as provided in Subsection 1018.09.

1018.05 MAXIMUM SHADE POINT HEIGHT STANDARD

The height of the shade point shall comply with either A or B below.

- A. Basic Requirement: The height of the shade point shall be less than or equal to the height specified in Table 1018-1 or computed using the following formula. If necessary, interpolate between the five-foot dimensions listed in Table 1018-1.

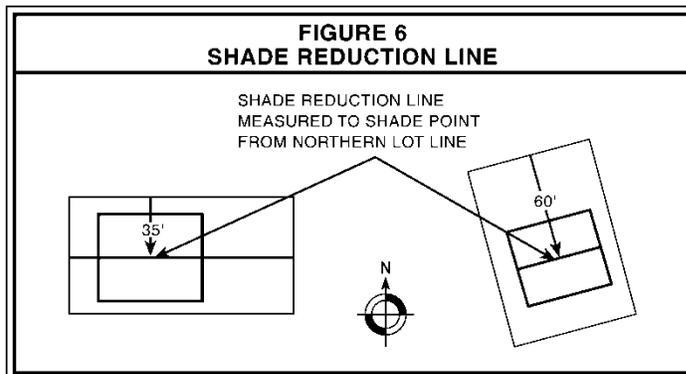
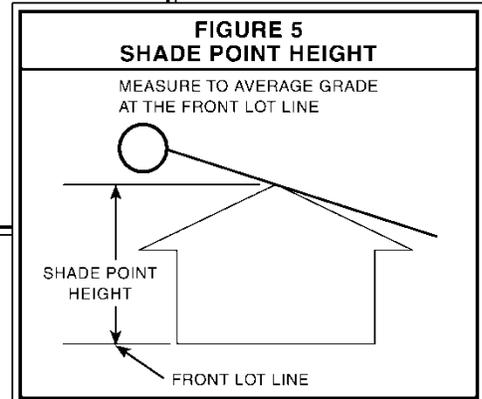
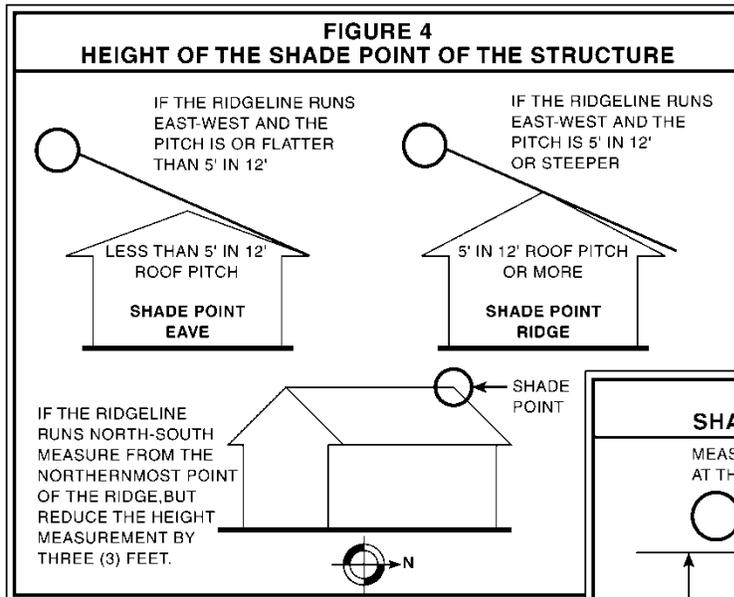
$$H = \frac{(2 \times SRL) - N + 150}{5}$$

Where: H = the maximum allowed height of the shade point (see Figures 4 and 5);

SRL = shade reduction line (the distance between the shade point and the northern lot line, see Figure 6); and

N = the north-south lot dimension, provided that a north-south lot dimension of more than 90 feet shall use a value of 90 feet for this section.

Adjustment to shade point height on sloped lots: The maximum allowed height of the shade point may be increased one foot above the amount calculated using the formula or Table 1018-1 for each foot that the average grade at the north property line exceeds the average grade at the south property line.



**Table 1018-1: Maximum Permitted Shade Point Height (in feet)**

Length of Shade Reduction Line	North-South Lot Dimension (in feet)										
	90+	85	80	75	70	65	60	55	50	45	40
70	40	41	42	43	44						
65	38	39	40	41	42	43					
60	36	37	38	39	40	41	42				
55	34	35	36	37	38	39	40	41			
50	32	33	34	35	36	37	38	39	40		
45	30	31	32	33	34	35	36	37	38	39	
40	28	29	30	31	32	33	34	35	36	37	38
35	26	27	28	29	30	31	32	33	34	35	36
30	24	25	26	27	28	29	30	31	32	33	34
25	22	23	24	25	26	27	28	29	30	31	32
20	20	21	22	23	24	25	26	27	28	29	30
15	18	19	20	21	22	23	24	25	26	27	28
10	16	17	18	19	20	21	22	23	24	25	26
5	14	15	16	17	18	19	20	21	22	23	24

- B. Performance Option: The proposed structure or applicable nonexempt vegetation will shade not more than 20 percent of the south-facing glazing of an existing habitable structure(s), or, where applicable, the proposed structure or nonexempt vegetation will comply with Subsection 1017.04(B) or 1017.04(C). If Subsection 1017.04(B) is used, nonexempt trees and the shade point of structures shall be set back from the protected solar building line two and one-half feet for every one foot of height of the structure or of the mature height of nonexempt vegetation over two feet.

1018.06 EXEMPTIONS FROM THE MAXIMUM SHADE POINT HEIGHT STANDARD

A proposed structure or nonexempt vegetation shall be exempt from Subsections 1018.04 and 1018.05, if one or more of the following conditions exist, based on plot plans or plats, corner elevations or other topographical data, shadow patterns, suncharts or photographs, or other substantial evidence submitted by the applicant.

- A. Exempt Lot: When created, the lot was subject to Section 1017, *Solar Access Ordinance for New Development*, and was not subject to Subsection 1017.07.
- B. Preexisting Shade: The structure or affected nonexempt vegetation will shade an area that is shaded by one or more of the following:
  - 1. An existing or approved building or structure;

2. A topographic feature;
  3. A nonexempt tree that will remain after development of the site. It is assumed a tree will remain after development if it: is situated in a building setback required by local law; is part of a developed area or landscaping required by local law, a public park or landscape strip, or legally reserved open space; is in or separated from the developable remainder of a parcel by an undevelopable area or feature; or is on the applicant's property and not affected by the development. A duly executed covenant also can be used to preserve trees causing such shade.
- C. Slope: The site has an average slope that exceeds 20 percent in a direction greater than 45 degrees east or west of true south, based on a topographic survey by a licensed professional land surveyor.
- D. Insignificant Benefit: The proposed structure or nonexempt vegetation shades one or more of the following:
1. An undevelopable area; or
  2. The wall of an unheated space, such as a typical garage; or
  3. Less than 20 square feet of south-facing glazing.
- E. Public Improvement: The proposed structure is a publicly owned improvement.

#### 1018.07 ADJUSTMENTS TO THE MAXIMUM SHADE POINT HEIGHT STANDARD

The maximum permitted height of the shade point determined using Subsection 1018.05 shall be increased to the extent that one or more of the following conditions exists, based on plot plans or plats, corner elevations or other topographical data, shadow patterns, suncharts or photographs, or other substantial evidence submitted by the applicant.

- A. Physical Conditions: Physical conditions preclude development of the site in a manner that complies with Subsection 1018.05, due to such things as a lot size less than 3,000 square feet, unstable or wet soils, a drainageway, public or private easement, or a right-of-way.
- B. Conflict Between Maximum Shade Point Height and Allowed Shade on Solar Feature Standards: A proposed structure may be sited to meet the solar balance point standard described in Subsection 1018.09 or be sited as near to the solar balance point as allowed by Subsection 1018.09 if:
1. When the proposed structure is sited to meet the maximum shade point height standard determined using Subsection 1018.05, its solar feature will potentially be shaded as determined using Subsection 1018.08; and

2. The application includes a form provided by the County that:
  - a. Releases the applicant from complying with Subsection 1018.05 and agrees that the proposed structure may shade an area otherwise protected by Subsection 1018.05;
  - b. Releases the County from liability for damages resulting from the adjustment; and
  - c. Is signed by the owner(s) of the property(ies) that would be shaded by the proposed structure more than allowed by the provisions of Subsection 1018.05.

Before the County issues a permit for a proposed structure for which an adjustment has been granted pursuant to Subsection 1018.07(B), the applicant shall file the form provided for in Subsection 1018.07(B)(2), in the office of the County Recorder with the deeds to the affected properties.

#### 1018.08 ANALYSIS OF ALLOWED SHADE ON SOLAR FEATURE

- A. The applicant is exempt from Subsection 1018.08 if the lot(s) south of and adjoining the applicant's property is exempt from Subsection 1018.05.
- B. Applicants shall be encouraged to design and site a proposed habitable structure so that the lowest height of the solar feature(s) will not be shaded by buildings or nonexempt trees on the lot(s) to the south. The applicant shall complete the following calculation procedure to determine if the solar feature(s) of the proposed structure will be shaded. To start, the applicant shall choose which of the following sources of shade originating from the adjacent lot(s) to the south to use in calculating the maximum shade height at the north property line:
  1. Existing structure(s) or nonexempt trees; or
  2. The maximum shade that can be cast from future buildings or nonexempt trees, based on Table 1018-2. If the lot(s) to the south can be further divided, the north-south dimension shall be assumed to be the minimum lot width required for a new lot in that zoning district.

**Table 1018-2**

<b>North-South Lot Dimension of Adjacent Lot(s) to the South</b>	100	95	90	85	80	75	70	65	60	55	50	45	40
<b>Allowed Shade Height at the North Property Line of Adjacent Lot(s) to the South</b>	12	12	12	13	14	15	16	17	18	19	20	21	22

- C. The height of the lowest point of any solar feature of the proposed structure shall be calculated with respect to either the average elevation or the elevation at the midpoint of the front lot line of the lot to the south.
- D. The applicant shall determine the height of the shadow that may be cast upon the applicant's solar feature by the source of shade selected in Subsection 1018.08(B) by using the following formula or Table 1018-3.

$$SFSH = SH(SGL/2.5)$$

Where: SFSH = The allowed shadow height on the solar feature (see Figure 8)

SH = The height of the shade at the northern lot line of the lot(s) to the south as determined in Subsection 1018.08(B)

SGL = The solar gain line (the distance from the solar feature to the northern lot line of the adjacent lot(s) to the south)

Table 1018-2 may be used to determine (SH) in the above formula.

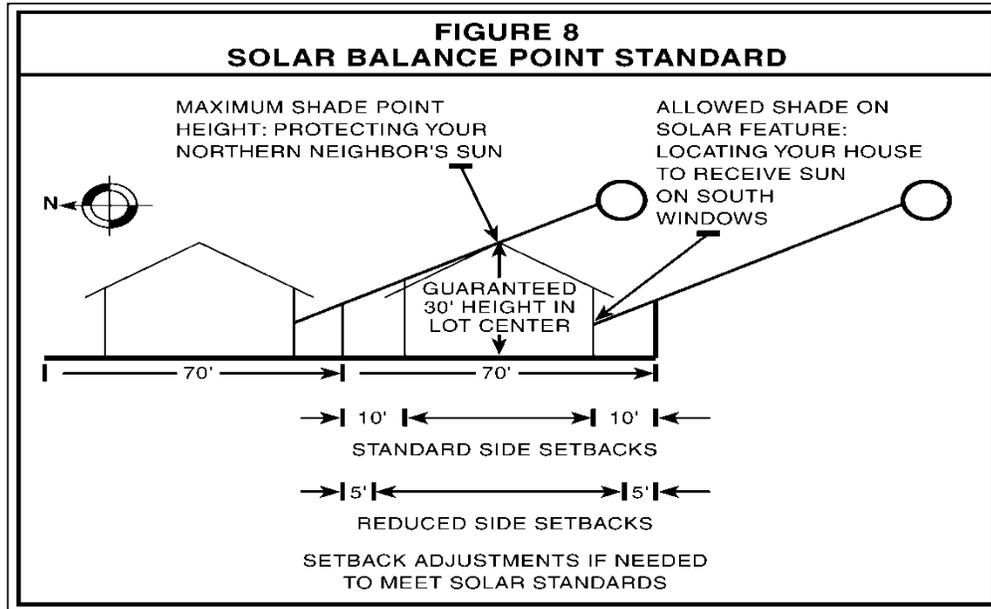
**Table 1018-3: Maximum Permitted Height of Shadow at Solar Feature (in feet)**

Distance from Solar Gain Line to Lot Line (in feet)	Allowed Shade Height at Northern Lot Line of Adjacent Lot(s) to the South (in feet)										
	22	21	20	19	18	17	16	15	14	13	12
50	2	1									
45	4	3	2	1							
40	6	5	4	3	2	1					
35	8	7	6	5	4	3	2	1			
30	10	9	8	7	6	5	4	3	2	1	
25	12	11	10	9	8	7	6	5	4	3	2
20	14	13	12	11	10	9	8	7	6	5	4
15	16	15	14	13	12	11	10	9	8	7	6
10	18	17	16	15	14	13	12	11	10	9	8
5	20	19	18	17	16	15	14	13	12	11	10

- E. If the allowed shade height on the solar feature calculated in Subsection 1018.08(D) is higher than the lowest height of the solar feature calculated in Subsection 1018.08(C), the applicant shall be encouraged to consider any changes to the structure design or location which would make it practical to locate the solar feature so that it will not be shaded in the future.

**1018.09 SOLAR BALANCE POINT**

If a structure does not comply with the maximum shade point height standard in Subsection 1018.05 and the allowed shade on a solar feature standard in Subsection 1018.08, the solar balance point of the lot shall be calculated (see Figure 8). The solar balance point is the point on the lot where the location of a structure would be the same for complying with both of these standards.



1018.10 YARD SETBACK ADJUSTMENT

The County shall grant an adjustment to the side, front and/or rear yard setback requirement(s) by up to 50 percent, if necessary to build a proposed structure so it complies with either the shade point height standard in Subsection 1018.05, the allowed shade on a solar feature standard in Subsection 1018.08, or the solar balance point standard in Subsection 1018.09 as provided herein (see Figure 8). This adjustment is not intended to encourage reductions in available solar access or unnecessary modification of setback requirements, and shall apply only if necessary for a structure to comply with the applicable provisions of Section 1018. The following are permitted yard setback adjustments:

A. In R-7 and R-8.5 Districts:

1. A front yard setback may be reduced to not less than 10 feet.
2. A rear yard setback may be reduced to not less than 10 feet.
3. A side yard setback may be reduced to not less than three feet.

B. In R-10, R-15, and R-20 Districts:

1. A front yard setback may be reduced to not less than 15 feet.
2. A rear yard setback may be reduced to not less than 15 feet.
3. A side yard setback may be reduced to not less than five feet.

1018.11 MINIMUM AND MAXIMUM SEPARATION DISTANCE IN THE HDR, SHD, AND RCHDR DISTRICTS

The following standards apply in the HDR, SDH, and RCHDR Districts:

A. Minimum North-South Separation: The minimum distance on a north-south axis between any building and a site area line north of said building shall be the horizontal distance calculated by drawing a 60-degree angle line from the top of the structure to the natural ground elevation north of the structure. For purposes of this provision, the "top of the structure" shall be that part of projection of the structure which first intersects a 60-degree angle line projecting toward the ground north of the building. (See Figure 1018-1.) This provision shall be modified as follows:

1. Intervening streets and 15 feet of setback into the property on the north side of said street may be included in the required separation distance.
2. If an area on the adjacent site north of a proposed structure is developed or committed for use as a circulation drive or parking structure or lot, that area may be included in the required separation distance, provided no existing or proposed primary use structure on the adjacent site shall fall within the required separation distance.
3. If the owner of the site area to the north grants a north-south separation easement, as provided under Subsection 1018.11(B), that area may be included in the required separation distance.

B. North-South Separation Easements: An owner, or owners, of a site area may grant a north-south separation easement to the owner, or owners, of a site area to the south provided that:

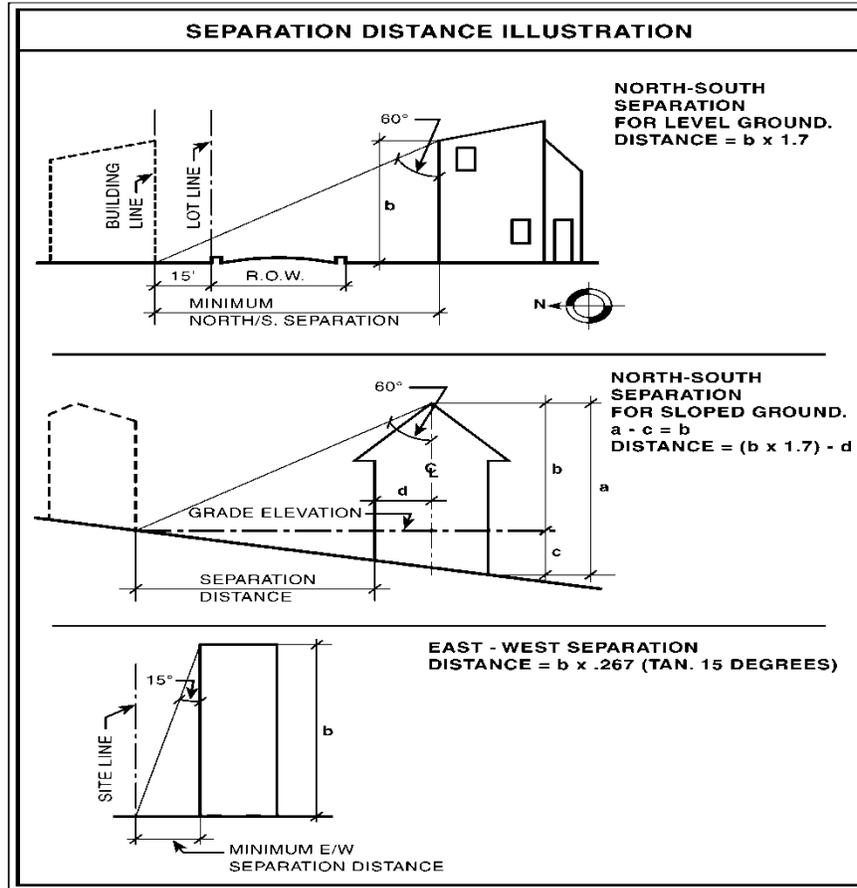
1. Documentation and a map of the easement is submitted with the development plans for the site areas in question;
2. The development plans for the two or more site areas in question are coordinated to the maximum extent possible; and
3. Buildings are sited to minimize the loss of solar access to primary use structures. However, this provision shall not preclude or restrict the use or development of any north-south separation easement area.

C. Minimum East-West Separation: The minimum distance on an east-west axis between any building and a site area line, except when abutting a public, County or state road, shall be the horizontal distance calculated by drawing a 15-degree angle line from the top of the structure to the natural ground elevation east and west of the structure. (See Figure 1018-1.)

$$\text{Formula: Separation} = b \times .267 (\tan 15 \text{ degrees})$$

D. Separation Exception: The north-south and east-west separation distance requirements shall not preclude structurally connecting two or more buildings on separate site areas provided that the proposed connection is approved as part of the development plans for the affected site areas.

**Figure 1018-1: Separation Distance Illustration**



- E. Exceptions: The standards of Subsection 1018.11 are not subject to modification pursuant to Sections 903, *Setback Exceptions*, and 904, *Other Exceptions*. However, these standards may be modified through design review pursuant to Section 1102, *Design Review*. Approval shall not be granted unless the modification requested is necessary to allow development of primary uses at densities allowed for the site area.

[Amended by Ord. ZDO-249, 10/13/14; Amended by Ord. ZDO-248, 10/13/14]