Deck Guide
Based on the 2012 International Residential Code
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General Notes

COMMON DECK GUIDELINES
All deck construction requires plan review, permits, and inspections in the District of Columbia. This guide provides an overview of code compliance requirements for deck construction and lays out the specific steps involved in the process. These typical deck details are provided to ensure design and construction of decks in the District of Columbia is consistent and code compliant. These guidelines apply to all new, single level decks, replacements, and expansions to a previously approved deck.

Decks excluded from these guidelines include: roof-top decks, decks on multi-family residences, decks that are proposed to be roofed or enclosed, commercial buildings, decks that are greater than 1,000 square feet, deck foundations adjacent to property lines, finished deck heights more 10 feet above grade, and land disturbance greater than 50 square feet (land disturbance that affects adjacent properties requires neighbor notification).

This is a general guideline for deck construction. Additional code requirements may apply to any specific project. The permitting sequence typically involves:
• Plan Preparation
• Plat Submission
• Permit Application
• Plan Review (Structural, Electrical, Zoning)
• Inspections
• Framing is required, if applicable (decks < 4 feet in height)

Prior to designing your deck, read this publication thoroughly and pay close attention to each applicable detail. Once you have selected the size of your deck, use the joist and beam span tables to determine their size, spacing, span lengths and overhang dimensions.

Use the remaining details to guide you in determining the other design elements of your deck. Ensure you record your deck design on the "Complete My Deck" section on page 36.

If you have questions, please contact the Department of Consumer and Regulatory Affairs at 202-442-4400, TTY 202-123-4567 or via email at dcra@dc.gov.

PLAN PREPARATION
Provide four copies of the "Complete My Deck" plan on page 36 that illustrate your desired deck layout. The layout should include dimensions of the deck and any steps or railings. A side view of the deck should also be provided.

PLAT SUBMISSION
Provide four copies of a D.C. Surveyor’s plat with dimensions that shows all existing buildings and the proposed deck, and on-site off-street parking. The proposed deck shall be depicted and the distance of the deck to the side and rear property lines shall be indicated on the plat. Indicate the lot occupancy calculation on the plat (e.g. the amount of existing square footage on the property - single family home, garage, accessory structures, and proposed deck). For more information about lot occupancy and setback requirements, please see the Appendix A on page 39.

APPLICATION AND APPROVAL PROCESS
1. Submit your Building Application with plans, plats, and supporting documents to the Permit Center on the second floor of DCRA, 1100 4th Street SW Washington D.C, 20024.
2. Your application will be entered into the permitting database and routed to the front counter and required disciplines (e.g. Zoning, Structural, Electrical) for review and approval.
3. After disciplines have reviewed and approved
the plans, plats and supporting documents, the building permit will be issued.

4. Pay the issuance fee and the building permit is issued. See Permit Fee Chart in Appendix D.

5. Inspections are required during and upon completion of the construction process.

ZONING CONSIDERATIONS
The zoning review will focus on verifying that the proposed deck complies with the applicable setback and lot occupancy requirements. Lot occupancy is the percentage of the total area of a lot that is occupied by the total building area of all buildings and structures on the lot. This includes all existing construction and proposed construction and is calculated by adding the total square footage of the existing construction (e.g. house, garage, shed and any other structure 4 feet or greater in height above grade) and the square footage of the proposed construction (e.g. deck) together and dividing it by the total area of the lot. For example, a lot is developed with a house and a garage that have a total square footage of 1,500 square feet. The applicant wants to construct a deck that is 4 feet in height and 250 square feet. 1,500 square feet plus 250 square feet equals 1,750 square feet. The lot area is 5,000 square feet. Divide 5,000 square feet (lot area) by 1,750 square feet (total existing and proposed construction) equals .035 or 35% lot occupancy. See Appendix A on page 39 specific regulations by zone.

BUILDING PERMIT ISSUANCE
After the required reviews have been completed and plans have been approved, the customer goes to the issuance desk, documents are given a final review, remaining fees are paid, and the building permit is issued. Fees can be paid by cash, check, and credit card. See Permit Fee Chart in Appendix D.

INSPECTIONS
Following construction, DCRA must conduct required inspections of the ramp construction to ensure it is in compliance with the approved plans. D.C. construction inspections are scheduled through DCRA’s phone-in inspection scheduling system (IVR). Further information can be found at: http://dcra.dc.gov/service/schedule-construction-inspection. The required inspections include footing, framing and final. If the finished deck level is smaller than four feet above grade, a framing inspection is required prior to decking.

FOOTING INSPECTIONS
Decks require a footing inspection after all excavation has been completed and before the footings, whether concrete or block are installed. The inspection code for a deck footing inspection is 160 in the IVR phone system.

FRAMING INSPECTION
A framing inspection should be requested before the deck boards are installed. This enables the building inspector to verify framing, appropriate connections and flashing. The inspection code for a framing inspection is 100 in the IVR phone system.

FINAL INSPECTION
A final inspection is required when the deck is complete, with all handrails and guard rails installed, and before use. The inspection code for a final inspection is 170 in the IVR phone system.

"USE THE JOIST AND BEAM SPAN TABLES TO DETERMINE THEIR SIZE, SPACING, SPAN LENGTHS AND OVERHANG DIMENSIONS."
MATERIAL SPECIFICATIONS
1. Lumber shall be preservative-treated, southern pine, grade #2 or better. Lumber not native to North America, such as Ipe, may be used as decking only; its use in guards is prohibited.
2. Lumber in contact with the ground shall be rated as “ground-contact.” Not all treated lumber is rated for ground contact.
3. Concrete in footings shall have a minimum compressive strength of 3,000 PSI.
4. Nails shall be threaded, ring-shanked or annular grooved. A half inch pilot hole shall be used at toe-nailing locations.
5. Carriage-bolts may be substituted where through-bolts are specified provided carriage-bolt washers (with square holes) are installed at the bolt head.
6. Fasteners shall be hot-dipped galvanized, stainless steel or approved for use with preservative-treated lumber.
7. Hardware and mechanical connectors, e.g. joist hangers or post anchors, shall be stainless steel or galvanized with 1.85 ounces of zinc per square foot (G-185 coating). Look for product lines such as “Zmax,” “Triple Zinc” or “Gold Coat.”
8. Flashing at ledger board connections (see Page 21) shall be copper (with copper nails only), stainless steel, UV resistant plastic, or galvanized steel with a G-185 coating.
9. Plastic composites are materials composed of bound wood and plastic fibers. Permissible as noted in this document, plastic composites must bear a label indicating its compliance with ASTM D 7032. Plastic composite’s label and installation instructions must be available to the inspector.
10. When using plastic composites, exercise caution as some members do not have the same capacity as their wood equivalents.
11. PVC decking and guards are permitted provided they have a valid evaluation report from an accredited listing agency such as the International Code Council - Evaluation Service. Installation shall be in conformance with the report and the manufacturer’s instructions which must be available to the inspector. The use of other materials and products, other than those permitted herein, shall be approved by DCRA prior to installation.

DESIGN CONSIDERATIONS
1. These details are based on the prescriptive requirements of the 2012 International Residential Code, industry best-practices and applicable referenced standards such as the National Design Specification for Wood Construction.
2. Framing members in these details are designed for a 40 PSF live load, 10 PSF dead load, normal loading duration, wet service conditions and deflections of $l/360$ for main spans and $l/180$ for overhangs with a 220-pound point load.
3. The use of these details to design and construct multi-level decks is prohibited.
4. Deviation from these details require approval by DCRA prior to construction.
5. Decks constructed in accordance with these details are not approved for privacy screens, planters, built-in seating, or hot tubs.
6. Decks must be designed to ensure rain and melting ice and snow flow away from the existing house.
7. Publication “DCA6” from the American Wood Council can also be used to obtain a permit. Go to awc.org to download.

"Deviation from these details require approval by DCRA staff prior to construction."
Deck Surface

Deck surfaces shall be preservative-treated or a species with naturally preservative properties for all wood, lumber and supporting wood columns. Decking shall be per Table 1 and placed perpendicularly or at an angle up to 45 degrees to the joists. Wood decking shall be attached per Figure 1. If installed wet, place decking with no gap so after drying a 1/8 inch gap is created. The use of hidden fasteners and similar attachment devices is prohibited. Each decking member shall bear on a minimum of three joists or blocking between joists. Placement and attachment of plastic composites shall be per the manufacturer’s instructions.

![Figure 1: Typical Decking](image)

Table 1: Decking Requirements and Maximum Joist Spacing

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Maximum Joist Spacing (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Size</td>
<td>Angular</td>
</tr>
<tr>
<td>Wood “five-quarter” board</td>
<td>12</td>
</tr>
<tr>
<td>Wood 2x4 or 2x6</td>
<td>16</td>
</tr>
<tr>
<td>Plastic composites, PVC</td>
<td>Per manufacturer</td>
</tr>
</tbody>
</table>

SAFETY GLAZING
To reduce injury due to an accidental impact, safety glazing in window glass is required when the existing house wall encloses any portion of the deck surface or acts as a barrier to stairs, landings and areas at the top and bottom of the stairs.

As shown in Figure 2, single panes of glass meeting all the requirements listed below must be safety-glazed. Glass area is greater than 9 square feet. The bottom edge of the pane is less than 18 inches above the walking surface of the deck, and the top edge of the pane is greater than 36 inches above the walking surface of the deck. In the absence of safety glazing, a horizontal rail across the window must be installed. The rail must meet the requirements of a stair handrail per page 33.

Single panes, partially or wholly located in the hatched area shown in Figure 2, must be safety-glazed. In the absence of safety glazing, a stair guard or handrail per page 33, must be constructed to separate the window from the stairway.

ELECTRICAL
Decks shall have a minimum of one electrical outlet along the perimeter of the deck and within 6.5 feet of the floor. Each stairway section shall have a light source that illuminates all stairs and landings. Lights shall be operated from interior switches, motion detectors or timed switches. Low voltage lighting at each stair tread is permissible.
Figure 2: Safety Glazing Requirements

- Safety glazing required
- No safety glazing required
- Single Pane Area > 9 sf
- Lower walking surface
- Walking surface of deck
- Adjacent Deck Surface
- Adjacent Stairs/Landing
Joists

- Joists are repetitively placed framing members spaced at 12, 16 or 24 inches on center which are supported at each end by a beam or ledger board.
- Single span decks are framed with joists that have one span between supports (not including overhang), as shown in Figures 3 and 4.
- Multi-span decks have joists with more than one span which bear on multiple beam, as shown in Figures 5 and 6.
- At the house connection, joists bear on the attached ledger board. Joists on a free-standing deck do not connect to the house; instead bearing is provided by an additional beam located at or near the house wall, as shown in Figure 7.

JOIST SIZE
- Joist span length is measured from the ledger board to the centerline of the supporting beam or between the centerlines of the supporting beams at each end.
- Joists are permitted to overhang past a dropped beam; joist span length does not include overhangs.
- The joists’ design is based on spacing, size and span length. Use Table 2 to determine joist size and the corresponding maximum allowable overhang. Note: the overhang dimension shall never exceed 1/4 of the actual joist span.
- Provide full-depth 2x blocking between overhanging joists above beam locations. Exception: blocking may be omitted if the overhang is less than or equal to 2 feet.
- Where blocking between joists is required, attach blocking using joist hangers at each end or by toe-nailing blocking to joists at each end, top and bottom with 10d nails.
- Attach a continuous rim joist or blocking at the joist ends, as shown in Figures 3, 5 and 7. Attach a rim joist to the end of each joist with (3)10d nails or (3)#10 by 3-inch wood screws.
- When choosing 2x6 joists, the corresponding ledger board must be a 2x8 minimum. See page 21 for more information.
- Guards cannot be attached to decks framed with 2x6 joists. See page 30 for more information.

<table>
<thead>
<tr>
<th>Joist Spacing (inches on center)</th>
<th>Joist Size</th>
<th>Allowable Span</th>
<th>Allowable Overhang</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2x6</td>
<td>9'-11”</td>
<td>1’-3”</td>
</tr>
<tr>
<td>12</td>
<td>2x8</td>
<td>13'-1”</td>
<td>2’-1”</td>
</tr>
<tr>
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<td>2x10</td>
<td>16'-2”</td>
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</tr>
<tr>
<td></td>
<td>2x12</td>
<td>18'-0”</td>
<td>4’-6”</td>
</tr>
<tr>
<td>16</td>
<td>2x6</td>
<td>9'-0”</td>
<td>1’-4”</td>
</tr>
<tr>
<td></td>
<td>2x8</td>
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</tr>
<tr>
<td></td>
<td>2x12</td>
<td>16’-6”</td>
<td>4’-2”</td>
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<tr>
<td>24</td>
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<td>7'-7”</td>
<td>1’-6”</td>
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<tr>
<td></td>
<td>2x10</td>
<td>11'-5”</td>
<td>2’-10”</td>
</tr>
<tr>
<td></td>
<td>2x12</td>
<td>13’-6”</td>
<td>3’-4”</td>
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</tbody>
</table>

Overhang dimension shall not exceed one-fourth of actual joist span.
Figure 3: Single Span Deck-Joists Attached at House with Dropped Beam

Figure 4: Single Span Deck-Joists Attached at House with Flush Beam

Figure 5: Multi-Span Deck-Joists with Dropped Beams

Figure 6: Multi-Span Deck-Joists with Flush Beams

Figure 7: Joists with Freestanding
FRAMING AT PROJECTIONS
Additional framing and ledger board fasteners per Section 6 on are required at projections such as chimneys or bay windows, as shown in Figure 9. Each ply of the header shall be equal to the deck joist size. Joist hangers shall meet the requirements below.

JOIST HANGERS
• Joist hanger depth, D, as shown in Figure 8, shall be greater than or equal to 60 percent of joist depth.
• The manufactured width of the joist hanger shall accommodate the number of plies being carried.
• Do not bend hanger flanges to accommodate field conditions.
• Joist hangers shall be fastened to the ledger board or flush beam using its manufacturer’s recommended screws. All other fasteners are permitted to be nails.
• Use joist hangers with inside flanges when clearances to the edge of the beam or ledger board dictate.
• Clip angles or brackets used to support framing members in lieu of joist hangers are prohibited.

JOIST -TO- BEAM CONNECTION
• Each joist shall be attached to the beam in accordance with Figure 10.
• Mechanical connectors or hurricane clips shall have a minimum capacity of 100 pounds in both uplift and lateral directions. Installation shall be per the manufacturer’s instructions.
• As shown in Figure 10, multi-span joists are permitted to span continuously over a dropped interior beam with one mechanical connector or overlap with a mechanical connector at each joist.

"Use joist hangers with inside flanges when clearances to the edge of the beam."
Figure 9: Framing at Chimney or Bay Window

Figure 10: Joist-to-Beam Connection

1 May be reduce to two-ply trimmer joist if joist spacing equals 24 inches on center or joist span is less than or equal to 8.5 feet.
Beams

• Beams are assembled, multi-ply framing members, which span between supporting posts. Multi-span decks have more than one beam. Spacing between beams is dependent on the allowable span lengths of the supported joists.
• Inside beams have joists bearing from each side. Outside beams have joists, with or without an overhang, bearing from one side.
• Dropped beams have joists bearing above. Flush beams have joists with hangers bearing on its sides; see Figures 3 through 7 and Figure 11.
• Multi-span decks are permitted to mix flush and dropped beams.

BEAM SIZE
• Beam size is based on its influence width and longest span length per Table 3. Beam influence width, as shown in Figure 11, is based on supported joists’ span lengths and overhang dimensions.
• Beam span length, as shown in Figure 12, is measured between the centerlines of two adjacent posts and does not include the beam overhangs.
• Beams may overhang past the center of the post up to 1/4 of the actual beam span.
• Flush beams shall have a depth greater than or equal to the deepest joist.

BEAM ASSEMBLY
• The plies of the beam shall be fastened in accordance with Figure 13.
• The distance from the centerline of the fastener to the top or bottom edge of the beam shall be 1/2 inch minimum.
• The distance from the centerline of the fastener to the ends of the beam shall be 1-inch minimum.
• Beam plies are permitted to have splices. However, splices shall be located at inside posts connections, as shown in Figure 12.

"Beams are assembled, multi-ply framing members which span between supporting posts."
**Figure 11: Beam Influence Width**

Outside Dropped Beam

Illustration showing beam influence width and components:
- $1/2$ joist span
- Overhang
- Joist span

Outside Flush Beam

Illustration showing beam influence width and components:
- $1/2$ joist span
- Overhang
- Joist span

Beamat Free - Standing Deck

Illustration showing beam influence width and components:
- $1/2$ joist-1 span
- $1/2$ joist-2 span
- Joist-1 span
- Joist-2 span

Inside Dropped Beam

Illustration showing beam influence width and components:
- $1/2$ joist-1 span
- $1/2$ joist-2 span
- Joist-1 span
- Joist-2 span

Inside Flush Beam

Illustration showing beam influence width and components:
- $1/2$ joist-1 span
- $1/2$ joist-2 span
- Joist-1 span
- Joist-2 span
Figure 11: Beam

Dropped Beam

Flush Beam

Figure 13: Beam Ply Fastening

1\(^{\text{st}}\) min.  
16\(^{\text{th}}\) typical fastener spacing  
1/2 min. top and bottom

10d nails or #10 x 3\(^{\text{rd}}\) wood screws, staggered in 2 rows.

for 3-ply beams, outside ply to inside as shown

2 fasteners at each end and splices
### Table 3: Minimum Beam Size

<table>
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<tr>
<th>Beam Influence Width (ft)</th>
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<th>8</th>
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</table>

1 Design conditions which fall within the shaded cells are prohibited.
Footings & Posts

FOOTING SIZE
Footing size is found by using Table 4 to obtain the footing type based on the beam influence width and the longest beam span length and Table 5 to determine the minimum footing dimensions. Footing sizes shall be consistent for each beam and designed for its maximum span. Footings shall bear on solid ground 30 inches below grade.

Footings shall be deeper if solid ground is not found. Bearing conditions must be verified by DCRA prior to placement of concrete. When the edge of a deck footing is closer than 5 feet to an existing exterior house wall, the footing must bear at the same elevation as the existing house footings as shown in Figure 14. Do not construct footings over utility lines or service pipes without calling Miss Utility at 1-800-257-7777 before you dig.

POST-TO-FOOTING CONNECTION
- Post attachment requirements shall be in accordance with Figure 15.
- Post anchors shall have a 1-inch minimum base.
- Posts shall be centered on the footing.

Table 5: Footing Size

<table>
<thead>
<tr>
<th>Type</th>
<th>Sides of Square (inches)</th>
<th>Diameter of Round (inches)</th>
<th>Thickness (inches)</th>
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<td>A</td>
<td>12</td>
<td>14</td>
<td>6</td>
</tr>
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<td>B</td>
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<tr>
<td>H</td>
<td>26</td>
<td>28</td>
<td>10</td>
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</tbody>
</table>

When less than 5 ft. footings must be at same elevation
Table 4: Footing Type and Maximum Post Height

<table>
<thead>
<tr>
<th>Beam Influence Width (ft)</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than or equal to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Footing Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Post Ht.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Footing Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Post Ht.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Footing Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Post Ht.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Footing Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Post Ht.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Footing Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Post Ht.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Footing Type and Maximum Post Height

POST SIZE & MAXIMUM HEIGHT

- Post size shall be 6x6 with a maximum height based on the corresponding beam influence width and longest beam span length, in accordance with Table 4. Posts with a height less than or equal to 2.5 feet are permitted to be 4x4.
- Post height is measured from the top of the footing to the underside of the beam.
- Cut ends of posts shall be field treated with a wood preservative containing copper naphthenate which can be found in the paint department of most hardware or home center stores.

BEAM-TO-POST CONNECTION

- Beams shall be attached to 6x6 posts using one of the methods shown in Figure 16 or 17. Beams shall be attached to 4x4 posts using the method shown in Figure 17.
- 4x4 posts are prohibited from supporting three-ply beams.
- Beams shall not be attached to the sides of an un-notched post as shown in Figure 18.
- Pre-manufactured post caps shall be specifically designed for 2 or 3 ply beams and the post size used. Attachment shall be per the manufacturer’s instructions.

Figure 15: Footings

POST SIZE & MAXIMUM HEIGHT

- Post size shall be 6x6 with a maximum height based on the corresponding beam influence width and longest beam span length, in accordance with Table 4. Posts with a height less than or equal to 2.5 feet are permitted to be 4x4.
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- Pre-manufactured post caps shall be specifically designed for 2 or 3 ply beams and the post size used. Attachment shall be per the manufacturer’s instructions.
Section 5

**Figure 16: Notched 6x6 Post-to-Beam Connection**

Typical Post

Post at Beam

**Figure 17: Post Cap Connection**

**Figure 18: Prohibited Connection**

---

Two-ply beam only

Beam must bear on notch

Section

Two or three ply beam

Pre-manufactured post cap
LEDGER BOARD ATTACHMENT

GENERAL REQUIREMENTS
• Ledger boards shall be attached to the existing house in accordance with the requirements herein. Compliance is critical to ensure the safety and structural stability of your deck.
• Ledger board depth shall be greater than or equal to the depth of the deck joists, but not less than a 2x8.
• The ledger board shall be attached in accordance with one of the conditions shown in Figures 20 through 22.
• The existing band board shall be capable of supporting the deck. If this cannot be verified or existing conditions differ from the details herein, then a free-standing deck or an engineered design is required. The top of the ledger board and top of the deck joists shall be at the same elevation.

WOOD I-JOISTS
Many homes are constructed with wood i-joists. Rather than utilize a 2x band board, these systems are often constructed with a minimum 1-inch thick engineered wood product (EWP) band board capable of supporting a deck. If a minimum 1-inch EWP or 2x band board is not present, then a free-standing deck or an engineered design is required.

FLASHING
Flashing shall be installed in accordance with the following requirements. See page 6 for flashing material specifications. The exterior finish, i.e. house siding, must be removed prior to the installation of the ledger board. Continuous flashing, as shown in Figure 20, is required at the ledger board when attached to wood-framed construction.

LEDGER BOARD FASTENERS
Ledger board fasteners shall be installed in accordance herein. Placement and spacing shall be in accordance with Figure 24 and Table 6. Only those fastener types noted herein are approved for use. Lead anchors are prohibited. Adequacy of connections will be verified by DCRA.

THROUGH-BOLTS
Through-bolts shall have a minimum inch diameter. Pilot holes for through-bolts shall be 17/32 to 9/16 inches in diameter. Through-bolts must be equipped with washers at the bolt-head and nut. Bolts should be tightened 6 to 12 months after construction due to dry-
ing and wood shrinkage.

EXPANSION ANCHORS
Expansion anchors shall be used only when attaching a ledger board to a concrete or solid masonry wall, as shown in Figure 21. The bolt or threaded rod of expansion anchors shall have a 1/2 inch diameter minimum; in some cases, this may require a 1/2-inch anchor size. Expansion anchors must be installed per the manufacturer’s instructions and shall be equipped with washers.

ADHESIVE ANCHORS
The adhesive anchors listed in Table 7 with a minimum 1/2 inch diameter threaded rod shall be used when attaching to concrete or solid or hollow masonry, as shown in Figure 22. Anchors shall be installed per the manufacturer’s instructions and shall be equipped with washers. Adhesive cartridges must remain on the jobsite for inspector verification.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Head</td>
<td>Epcon A7</td>
</tr>
<tr>
<td>Hilti</td>
<td>HY-70</td>
</tr>
</tbody>
</table>

Table 7: Approved Adhesive Anchors

LAG SCREWS
Lag screws shall be hot-dipped galvanized or stainless steel with 1-inch minimum diameter. Length and shank requirements shall be in accordance with Figure 25. Lag screws shall be equipped with washers and installed in the sequence below:
1. Drill a 1/2-inch diameter hole in the ledger board and a 5/16-inch diameter pilot-hole into the solid connection material of the existing house.
2. Insert the lag screw through the ledger board and into the pilot hole by turning. Do not drive with a hammer. Use soap or a wood-compatible lubricant as required to facilitate tightening.
3. Tighten each lag screw snugly, but do not over tighten so as to cause wood damage.

WOOD SCREWS
The wood screws listed in Table 8 with a 1/4-inch diameter may be used to attach to wood-framed construction. Wood screws shall have a sufficient length to fully penetrate the existing house band board. Installation shall be per the manufacturer’s instructions.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>FastenMaster</td>
<td>LedgerLOK</td>
</tr>
<tr>
<td>Simpson Strong-Tie</td>
<td>SDS Strong-Drive Screws</td>
</tr>
<tr>
<td>Simpson Strong-Tie</td>
<td>SDWS Strong-Drive Screws</td>
</tr>
</tbody>
</table>

Table 8: Approved Wood Screws

Figure 25: Lag Screw
Figure 20: Ledger Board-to-Band Board Attachment

- Exterior sheathing
- Existing stud wall
- Existing 2x or 1" minimum EWP band board
- Floor joist
- Foundation
- Remove siding at ledge prior to installation
- Continuous flashing
- Deck joist
- 1/2" diameter lag screws or through-bolts or 1/4" approved wood screws
- Joist hanger
- 2x ledger board

Figure 21: Ledger Board-to-Solid Foundation Attachment

- Edge distance per manufacturer
- Concrete or solid masonry wall
- Embedment distance per manufacture
- Deck joist
- 1/2" diameter expansion anchors with washers
- Joist hanger
- 2x ledger board

Figure 22: Ledger Board-to-Hollow Foundation Attachment

- Edge distance per manufacturer
- Hollow masonry wall
- Embedment distance per manufacturer
- Deck joist
- 1/2" diameter approved adhesive anchors with washers
- Joist hanger
- 2x ledger board attached to block wall; attachment through brick veneer is prohibited.

To resist corrosion and decay, this area should be caulked.
**PROHIBITED LEDGER ATTACHMENTS**

The ledger board attachment conditions shown below are prohibited. In such cases, a free-standing deck or engineering design is required.

*Figure 23: Prohibited Ledger Attachments*

- open web floor trusses
- deck joist
- brick/stone veneer or masonry chimney
- overhang or bay window

*Figure 24: Ledger Board Fastener Spacing, Inches on Center*

- 2" min. each end
- 2" min.
- typical spacing
- 5 1/2" min. for 2x8
- 6 1/2" min. for 2x10
- 3/4" min.
- interior fasteners; 2 rows staggered
- 2"
### Table 6: Ledger Board Fastner Spacing, Inches, on Center

<table>
<thead>
<tr>
<th>Fastener</th>
<th>Board</th>
<th>EWP 1</th>
<th>2x lumber</th>
<th>EWP</th>
<th>2x lumber</th>
<th>EWP</th>
<th>2x lumber</th>
<th>EWP</th>
<th>2x lumber</th>
<th>EWP</th>
<th>2x lumber</th>
<th>EWP</th>
<th>2x lumber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lag Screws</td>
<td></td>
<td>24</td>
<td>30</td>
<td>24</td>
<td>36</td>
<td>12</td>
<td>13</td>
<td>36</td>
<td>22</td>
<td>36</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Through-Bolts</td>
<td></td>
<td>18</td>
<td>23</td>
<td>18</td>
<td>36</td>
<td>9</td>
<td>10</td>
<td>34</td>
<td>16</td>
<td>34</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDS, LedgerLOK</td>
<td></td>
<td>12</td>
<td>24</td>
<td>14</td>
<td>29</td>
<td>7</td>
<td>8</td>
<td>29</td>
<td>24</td>
<td>7</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood Screws</td>
<td></td>
<td>10</td>
<td>15</td>
<td>12</td>
<td>24</td>
<td>5</td>
<td>6</td>
<td>24</td>
<td>21</td>
<td>5</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDWS Wood Screws</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Adhesive Anchors</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. EWP = 1-inch minimum manufactured engineered wood product; see page 22 for more information.
2. Wood screws shall be permitted to be spaced in accordance with its current corresponding evaluation report if less restrictive than the values in Table 6.
All decks with post heights greater than 2.5 feet are required to be designed to resist lateral load caused by human activity and environmental forces. Use Table 9 to determine the applicable methods based on post height and deck type as defined in Section 3.

METHOD-1, TENSION-TIES:
- Install one tension-tie at each end joist and install the remaining two to inside joists equally spaced along the width of the deck, as shown in Figure 26. A set of tension-ties shall be installed for each structurally independent section of deck.
- Tension-ties shall be attached to the joists and exterior wall per the manufacturer's instructions with specified fasteners as shown in Figure 27. Fasteners shall penetrate a minimum of 3 inches into the sill plate or top plate of a wood framed wall.
- Approved tension-ties are listed in Table 10. The minimum capacity of each tension-tie shall be 750 pounds.
- When attaching to a concrete or solid masonry wall, fasteners are permitted to be substituted with expansion anchors or adhesive anchors with a threaded rod as recommended by the tension-tie per the manufacturer's instructions. The withdrawal capacity of the anchors shall be a minimum of 750 pounds. The anchor shall be installed per the manufacturers recommendations.

METHOD-2, KNEE-BRACING AT BEAM:
- Knee-bracing shall be comprised of 2x or 6x6 members.

Table 10: Approved Tension-Ties

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simpson Strong-Tie</td>
<td>DTT1</td>
</tr>
<tr>
<td>USP</td>
<td>LTS19</td>
</tr>
<tr>
<td>USP</td>
<td>ADTT-TZ</td>
</tr>
</tbody>
</table>

“All decks with post heights greater than 2.5 feet are required to be designed to resist lateral load caused by human activity and environmental forces.”
### Table 9: Lateral Support Requirements

<table>
<thead>
<tr>
<th>Post Height (feet) less than or equal to:</th>
<th>Single Span Decks</th>
<th>Multi-span Decks</th>
<th>Free-standing Decks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>None required</td>
<td>None required</td>
<td>None required</td>
</tr>
<tr>
<td>11</td>
<td>· Method 1 or</td>
<td>· Method 2</td>
<td>· Method 2 and</td>
</tr>
<tr>
<td></td>
<td>· Method 2</td>
<td></td>
<td>· Method 3</td>
</tr>
<tr>
<td>14</td>
<td>· Method 1 and</td>
<td>· Method 1 and</td>
<td>· Method 1,</td>
</tr>
<tr>
<td></td>
<td>· Method 2</td>
<td>· Method 2</td>
<td>· Method 2 and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>· Method 3</td>
</tr>
</tbody>
</table>

**Figure 26: Method 1 - Tension Tie Locations**

*install 4 tension-ties: one at each end joist and two equally spaced inside joists.*

**Figure 27: Method 1 - Tension-Tie Connection¹**

1. Tension-ties may be anchored to concrete or solid masonry walls with expansion or adhesive anchors as permitted on page 22.
METHOD-3, KNEE-BRACING AT JOISTS-POST LOCATIONS (free-standing decks only):
• Knee-bracing shall be comprised of 2x or 6x6 members.
• Knee-bracing shall be installed at each post-joist location in accordance with Figure 29.
• Connections of knee-bracing shall be in accordance with Figure 30 or 31.

![Figure 28: Method 2 - Knee Bracing At Beam - Post Locations](image)

![Figure 29: Method 3 - Knee Bracing At Joist-Post Locations](image)
alternate bracing from front to back of posts

Figure 30: Typical Connections of 2x Knee Bracing

<table>
<thead>
<tr>
<th>At Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR</td>
</tr>
<tr>
<td>At Joist or Beam</td>
</tr>
<tr>
<td>(2) 20d nails or (2) approved wood screws at all connections</td>
</tr>
<tr>
<td>At Unaligned Joist</td>
</tr>
<tr>
<td>24” min.</td>
</tr>
<tr>
<td>add blocking to accommodate connection</td>
</tr>
<tr>
<td>2 rows (10) 10d nails or #10 screws</td>
</tr>
</tbody>
</table>

1 Approved wood screws are listed in Table 8.
2 Nails shall have a distance of 3/8 inches to all edges and 7/8 inches to ends of the bracing member.

Figure 31: Typical Connections of 6x6 Knee-Bracing

<table>
<thead>
<tr>
<th>At Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>bracing</td>
</tr>
<tr>
<td>1/2” horizontal through-bolt</td>
</tr>
<tr>
<td>post</td>
</tr>
<tr>
<td>3/4” min. each</td>
</tr>
<tr>
<td>joist or beam</td>
</tr>
<tr>
<td>optional recess</td>
</tr>
<tr>
<td>mitre/notch recess in bracing for fastener(s)</td>
</tr>
</tbody>
</table>

| At Beam or Joist |
| (1) 1/2” lag screw, (2) 20d nails or (2) approved wood screws |
| notch bracing and/or provide blocking to accommodate connection |

1 Approved wood screws are listed in Table 8.
Guards

GUARD CONSTRUCTION
A guard is required when a deck is greater than 30 inches above grade at a point 36 inches from the edge of the deck, as shown in Figure 32. Guards shall be constructed in accordance with the requirements herein; deviations are prohibited. Guards which are not required, but are provided, must also comply with these requirements.

PLASTIC COMPOSITES
Plastic composites of equal dimension and complying with the criteria noted on page 8 may be substituted for the guard cap and infill elements shown in Figure 33, provided the manufacturer’s performance criteria specifically permit such use.

GUARD SYSTEMS
Guard systems with a valid evaluation report from an accredited listing agency are permitted as referenced on page 8. Pre-fabricated systems without an evaluation report will require a plan review during the permit application process.

OPENINGS
Guards shall be constructed to restrict the passage of a 4-inch diameter sphere through any opening. Wet lumber shall be spaced such that when shrinkage occurs, a compliant opening is maintained.

GUARD POST CONNECTION
Guard posts shall be attached to the deck structure in accordance with the requirements below in order to ensure resistance to imposed loads:

- Notching guard posts, as shown in Figure 34, is prohibited.
- Hold-down anchors, as shown in Figures 35 and 36, shall be used to attach the guard post to the end joist and rim joist, respectively.
- Hold-down anchors shall have a minimum capacity of 1,800 pounds.

Guards may be attached to either side of the rim joist or end joist.

Figure 32: When A Guard is Required

“A guard is required when a deck is greater than 30 inches above grade at a point 36 inches from the edge of the deck.”

---

---
Figure 33: Guard Construction

2x2 ballusters spaced such that a 4" diameter sphere cannot

6' maximum

guard cap: 2x6, "five-quarter"

attach guard cap to post with (3) 16d nails or (3) #12 wood screws

2x4 guard runners fastened to guard post with (2) 8d nails or (2) #8 wood screws

attach ballusters to guard runners with (1) #8 wood screw or (2) 8d nails

4x4 posts

36" minimum

(2) 1/2 " diameter through bolts and washers

2 min. top and bottom

2x8 minimum

Figure 34: Post Notches Prohibited

do not notch

Figure 35: Guard Post -to- End Joist

at first interior bay, provide full depth 2x blocking at guard posts; toe nail with 10d nails top and bottom, each side

guard post

hold down anchors

guard post

end joist

blocking

end joist

fasteners and attachment per hold-down manufacturer

1 Guards can be attached to either side of the end joist

1

The Department of Consumer and Regulatory Affairs
Guards can be attached to either side of the rim.

Figure 36: Guard Post-to-Rim Joist

Section

Plan Views

1 Guards can be attached to either side of the rim.
Stairs

STAIR GEOMETRY
Stairs shall be constructed with the dimensions listed below:

- The minimum width of a stairway is 36 inches.
- Stair geometry and opening limitations shall meet the requirements shown in Figure 37. Treads, risers and nosing dimensions shall not deviate at each step by more than a 1/4 inch.

STAIR LANDING
• If the total vertical height of a stairway exceeds 12 feet, then an intermediate landing is required and must be constructed as a free-standing deck.
• Stair landings may be constructed with 4x4 posts with post heights no greater than 8 feet.
• Landing widths shall be equal to the total width(s) of the stairway(s) served.

STAIR CONSTRUCTION
Stair stringers:
• Stringers shall be sawn or solid 2x12s complying with the tread and riser geometry requirements.
• Stringers shall be spaced at a maximum of 18 inches on center.
• Stringers shall bear on footings and attach to the deck or landing per Figure 38.
• Stringer span length is measured using the horizontally projected distance between the bearing at each end and shall not exceed the dimensions shown in Figure 39.

SOLID STRINGER EXCEPTION:
Solid stringers of stairways with a width equal to 36 inches shall be permitted to have a span as shown in Figure 39. Throat size of cut stringers shall not exceed the value shown in Figure 39.

TREAD AND RISER MATERIAL:
• Tread material shall be equivalent to the decking specified on page 8 and attached in accordance with Figure 40. The span of plastic composites shall be per the manufacturer and in some cases may be less than 18 inches specified in Figure 40.
• Stairs constructed using the solid stringer exception shall have treads constructed of 2x wood material only, as shown on Figure 40.
• Risers may be framed with 1x lumber minimum or equivalent plastic composite. Open risers are permitted provided the opening does not allow the passage of a 4-inch diameter sphere.

STAIR GUARDS
Stair guards are required when the total rise of the stair is greater than 30 inches at a point 36 inches from the edge of the stair. Stair guards shall be constructed in accordance with Section 8 and Figure 41.

HANDRAILS
• Stairs with 4 or more risers shall have a handrail on one side at a height between 34 to 38 inches above the nosing of the step.
• Handrails shall be attached to a stair guard or exterior wall acting as a barrier as shown in Figure 42.
• Handrail and connecting hardware material shall be decay and corrosion resistant.
• Handrails shall have a smooth surface with no sharp corners and shall be graspable. Recessed sections may be shaped from a 2x6 or five-quarter board as shown in Figure 43.
• Handrails shall run continuously from a point directly over the lowest riser to a point directly over the highest riser and shall return to the guard or wall at each end.
• Handrails may be interrupted by guard posts at a turn in the stair only.
• Handrails installed in lieu of window safety glazing, as required on page 8, shall be supported at appropriate intervals to ensure that when a 50-pound load is applied, the rail does not deflect into the glass.
Figure 37: Treads and Risers

- Toe nail with (3) 8d nails
- Beam or outside joist
- Landing structure

Figure 38: Stringer Bearing

- Lower Bearing at Landing
- Upper Bearing at Deck or Landing
- Lower Bearing at Footing

Figure 39: Maximum Stringer Span Length

- 9" min. thread
- 4" diameter sphere shall not pass

Figure 40: Stringer Treads

- Outside solid stringers
- Cut stringer

Sawn & Cut Stringer Combination

Cut Stringers

Solid Stringer Exception

- Width = 36'
- 2x wood material only
- 2x ledger strip, each side, full depth of tread; attach with (4) 10d nails or (4) #10 screws
Figure 41: Stair

- 34”-38” (measured from nosing of step to top of stair guard)
- Triangular opening shall not permit the passage of a 6” diameter sphere
- Provide blocking between stair stringers and hold-down anchors as shown at guard post locations; toe nail blocking with 10d nails each side

Figure 42: Handrails

- 1 1/2” min.
- 2x blocking
- Attach blocking and handrail with 8d nails at 16” o.c.
- 1 1/4” - 2” min.
- 34”-38” to nosing of stairs
- Corrosion-resistant handrail hardware
- Handrail return at top and bottom

Figure 43: Handrail Graspability

- 1 1/4” - 2” min.
- 2 1/4” max.
- 1 3/4” min.
- 3/4” max.
- Recessed
Prior to construction, design the specifics of your deck and complete the information required below. This information shall be available to the inspector at each inspection.

In the box below and on page 37, sketch your desired deck layout. The layout should include the dimensions of the deck and any steps or railings. A side view of the deck should be provided on page 37.

*3 squares = 1 foot*
Complete the design details of your deck below:

**DECKING:**  
Size: [ ] 2x4/2x6 [ ] five-quarter board  
Direction: [ ] angled [ ] perpendicular  
Material: [ ] preservative-treated lumber [ ] plastic composite [ ] non-native lumber [ ] PVC

**JOIST 1:**  
Size: [ ] 2x6 [ ] 2x8 [ ] 2x10 [ ] 2x12  
Spacing: [ ] 12 in. [ ] 16 in. [ ] 24 in.  
Longest Span: __ft. - __in.  
Overhang: __ft. - __in.  
Rim Joist: [ ] 2x6 [ ] 2x8 [ ] 2x10 [ ] 2x12 [ ] not applicable

**JOIST 2:**  
Size: [ ] 2x6 [ ] 2x8 [ ] 2x10 [ ] 2x12  
Spacing: [ ] 12 in. [ ] 16 in. [ ] 24 in.  
Longest span: __ft. - __in.  
Overhang: __ft. - __in.  
Rim joist: [ ] 2x6 [ ] 2x8 [ ] 2x10 [ ] 2x12 [ ] not applicable

**BEAM 1:**  
Plies: [ ] 2 [ ] 3  
Size: [ ] 2x6 [ ] 2x8 [ ] 2x10 [ ] 2x12  
Influence width: __ft. - __in.  
Longest span: __ft. - __in.  
Overhang: __ft. - __in.  
Footing size: __in.  
[ ] square [ ] round  
Thickness: __in.  
Post size: [ ] 4x4 [ ] 6x6  
Post height: __ft. - __in.

**BEAM 2:**  
Plies: [ ] 2 [ ] 3  
Size: [ ] 2x6 [ ] 2x8 [ ] 2x10 [ ] 2x12  
Influence width: __ft. - __in.  
Longest span: __ft. - __in.  
Overhang: __ft. - __in.  
Footing size: __in.  
[ ] square [ ] round  
Thickness: __in.  
Post size: [ ] 4x4 [ ] 6x6  
Post height: __ft. - __in.

**LEDGER BOARD:**  
Size: [ ] 2x8 [ ] 2x10 [ ] 2x12  
[ ] not applicable (Free-standing Deck)  
Fastener: [ ] through-bolt [ ] lag screw [ ] expansion anchor [ ] adhesive anchor [ ] wood screw  
Spacing: __in.
## R - Zone

### District of Columbia - Zoning Residential District Development Standards (R & RF Zones)

Per Title 11, DCMR of the 2016 Zoning Regulations (Subtitle D) -- As of Sept 6 2016

<table>
<thead>
<tr>
<th>ZONE USE</th>
<th>MINIMUM LOT DIMENSIONS</th>
<th>MAXIMUM BUILDING HEIGHT</th>
<th>MAXIMUM FLOOR AREA RATIO</th>
<th>MAXIMUM LOT OCCUPANCY</th>
<th>MINIMUM YARD SETBACKS</th>
<th>MINIMUM PERVIOUS SURFACE</th>
<th>MINIMUM GREEN AREA RATIO (G.A.R.)</th>
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<tbody>
<tr>
<td>Width</td>
<td>Area</td>
<td>Ratio (To the tenth)</td>
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<td>(Feet)</td>
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RF - Zone

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<th>MINIMUM LOT DIMENSIONS</th>
<th>MAXIMUM BUILDING HEIGHT</th>
<th>MAXIMUM FLOOR AREA RATIO (F.A.R.)</th>
<th>MAXIMUM LOT OCCUPANCY</th>
<th>MINIMUM YARD SETBACKS</th>
<th>MINIMUM PERVIOUS SURFACE</th>
<th>MINIMUM GREEN AREA RATIO (G.A.R.)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Width (Feet)</td>
<td>Area (Sq. Ft.)</td>
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<td>%</td>
<td>(Feet)</td>
<td>(Feet)</td>
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## District of Columbia - Zoning Residential District Development Standards (RA-Zones)

Per Title 11, DCMR of the 2016 Zoning Regulations (Subtitle F) -- As of Sept 6 2016

<table>
<thead>
<tr>
<th>ZONE USE</th>
<th>MINIMUM LOT DIMENSIONS</th>
<th>MAXIMUM BUILDING HEIGHT</th>
<th>MAXIMUM FLOOR AREA RATIO (F.A.R.)</th>
<th>MAXIMUM LOT OCCUPANCY</th>
<th>MINIMUM YARD SETBACKS</th>
<th>MINIMUM PERVIOUS SURFACE</th>
<th>MINIMUM GREEN AREA RATIO (G.A.R.)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Width (Feet)</td>
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<td>0.9</td>
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<td>75</td>
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## Deck Permit Fees

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<th>Construction valued between $501-$1,000</th>
<th>Construction valued between $1,001-$1,000,000</th>
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<td>$65.00</td>
<td>$30 + 2% of cost</td>
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<tr>
<td>Green Building Fee</td>
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<td>Add 0.13% of construction value</td>
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<tr>
<td>Enhancement Fee</td>
<td></td>
<td>A 10% Additional fee will be applied to the total cost.</td>
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