

**Audubon's  
Mississippi River Field Institute's**

*Illustrated & Simplified Companion to*

**Paul & Georgean Kyle's**

**Chimney Swift Towers**

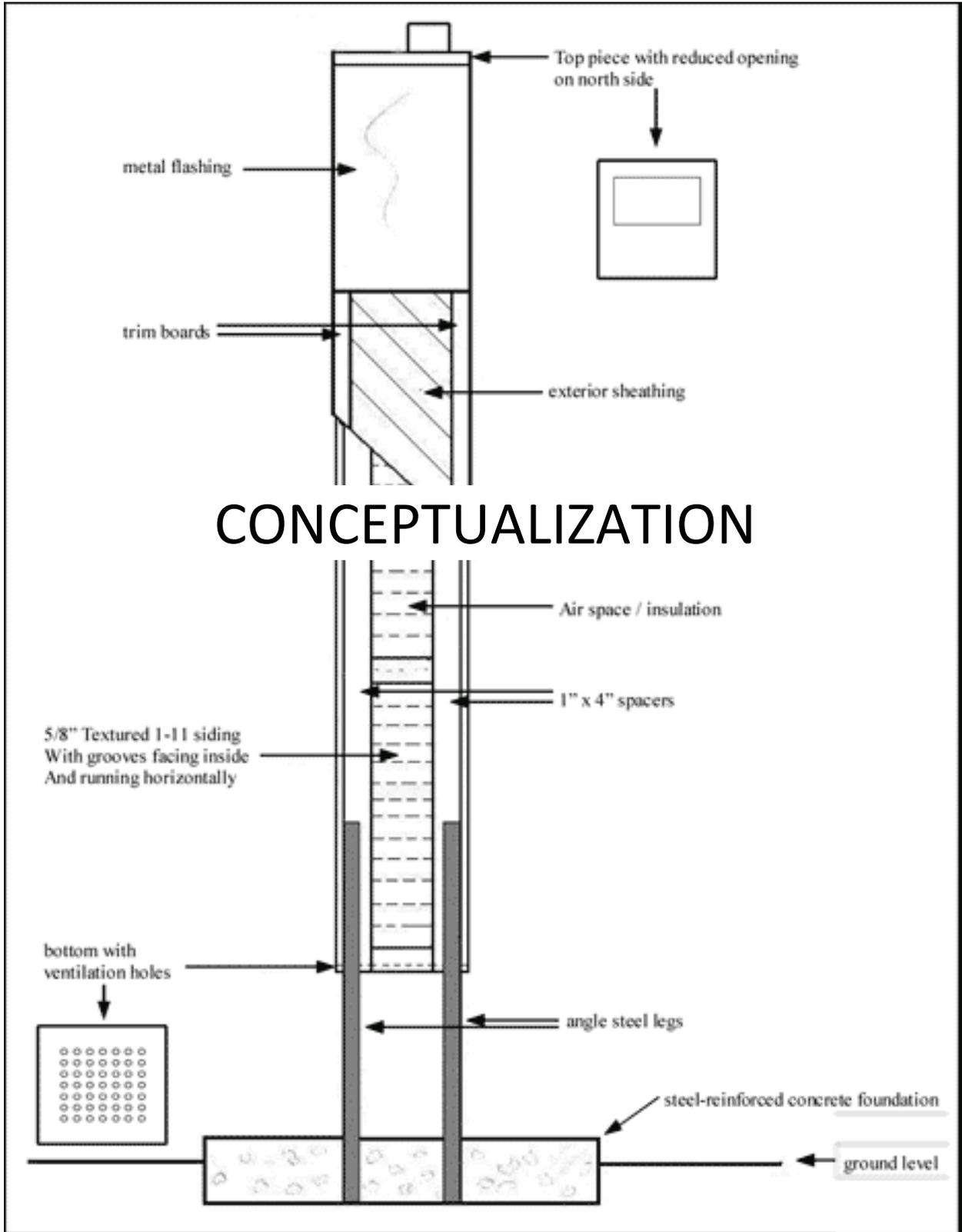
***New Habitat for America's Mysterious Birds,  
A Construction Guide***

INTENDED FOR 4+ PERSONS

Documentation Composed by  
Men and Women of  
AmeriCorps NCCC  
Class 16 – Vicksburg, MS Campus

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## A Chimney Swift Tower

Originally designed by Althea Rosina Sherman and introduced in her 1952 book *Birds of an Iowa Dooryard* (Christopher Publishing House, 1952), the Chimney Swift tower is a unique structure used to protect and encourage the nesting of Chimney Swift birds. Faced with a change in chimney design in the late twentieth century and an increase in deforestation, the Chimney Swift bird continues to encounter considerable hardship in establishing new homes. To alleviate the bird's difficulties, Sherman's Chimney Swift tower provides protection from inclement elements, safety from a variety of dangerous predators, and a comfortable niche for the birds to roost.

Our tower's designs were based off of Paul and Georgean Kyle's *Chimney Swift Towers: New Habitat for America's Mysterious Birds, A Construction Guide* (Texas A&M University Press, 2005). While an excellent technical manual for construction, a more simplified and picture-based guide would better suite fledgling designers interested in constructing their own tower.

## The Interior Nesting Chambers

A Chimney Swift tower is made up of three interior nesting chambers, each four-feet tall and roughly fifteen-inches wide. These nesting chambers form the inside of the tower where the Chimney Swift inhabits. The nesting chambers are created using Textured-One Eleven (T1-11) plywood, which is a special type of plywood that has *ridged edges*. The ridged edges are unique and necessary to the project because they help stabilize the assembly of the tower; when one box is placed atop another, they smoothly interconnect along the ridges. This makes assembly both easy and intuitive.

Additionally, T1-11 has one flat side similar to standard plywood and one textured side with a patterned indentation on it; the textured side will form the interior of the chamber where the Chimney Swift inhabits and the flat outside surface will be where you connect the legs, braces, insulation, and siding.

## The Legs and Foundation

When all three nesting chambers are assembled, your Chimney Swift tower will stand roughly twelve feet high (before adding the legs). Because the bottom of the nesting chamber is flat, further suspension is necessary so that the chamber can be properly ventilated at the bottom. To acquire this, four angled-steel legs are drilled into the bottom nesting chamber, adding another three feet to the bottom of the structure. These legs are then anchored into a foundation with quick-drying concrete to prevent capsizing. With the legs in place, your Chimney Swift tower will have a comfortable air cushion at the bottom for ventilation.

### **The Ventilation Unit**

At the very bottom of your nesting chamber will be a ventilation unit made of  $\frac{3}{4}$ " plywood. Because you want air to enter the bottom of the chamber, this ventilation unit is patterned with a series of forty-nine  $\frac{1}{2}$ " holes; these holes allow proper ventilation while keeping any invasive creatures from sneaking in through the bottom of the chamber.

### **The Braces**

Although the three nesting chambers fit together through the ridged edges of the T1-11 plywood, the tower simply would not have enough support without any type of bracing. Using 1" x 4" lumber, wooden braces are screwed into the four corners of your assembled nesting chambers to add extra stability. Because of the angled-steel legs that overlap with the bottom three feet of your tower, some of your wooden braces will have to be notched (or cut out) so that the wooden braces will be flush against the angled-steel legs.

### **The Sun Collar**

Because of the T1-11 plywood on the sides of your nesting chamber and the ventilation unit on the bottom, the Chimney Swifts still need a way to enter the tower. The sun collar is a protective eight-inch-high box placed atop a hole in  $\frac{3}{4}$ " plywood that is subsequently screwed into the top of your tower. Since the sun collar is screwed into the braces on the side of your box, attaching the sun collar is one of the last steps in your construction.

### **The Insulation & Siding**

Left to its own device, the Textured-One Eleven plywood used to construct your nesting chambers would be inefficient in handling the rigors of outdoor elements. To properly secure your tower, it is strongly advised that you use insulation and siding. What type of insulation you purchase is dependent on funds and preference, though for the purpose of these instructions we will be constructing our tower with vinyl siding.

## List of Tools

Two (2) 8'0" x 4'0" board of Textured-One Eleven (T1-11) plywood  
One (1) 8'0" x 4'0" board of  $\frac{3}{4}$ " plywood  
Eight (8) twelve-foot pieces of 1" x 4" lumber  
One (1) eight-foot piece of 1  $\frac{1}{2}$ " x 1  $\frac{1}{2}$ " lumber  
Two (2) ten-foot pieces of 2" x 10" lumber  
Eight (8) ten-foot  $\frac{3}{4}$ " pipes of rebar  
Four (4) six-foot pieces of angled-steel  
Twenty (20) bags of quick-drying concrete (QuickCrete)  
Insulation & siding

A drill (with a variety of bits)  
A skilsaw (portable circular saw), hand saw, or table saw  
A hack saw  
A pencil  
A straightedge and/or carpenter's edge (steel square)  
A level (bubble or laser line)  
A shovel  
A hammer or mallet  
An exacto knife  
A pair of wire cutters  
Three (3) or more tubes of liquid nail adhesive  
Two (2) twelve- or fifteen-foot ladders  
1  $\frac{1}{4}$ " deck screws  
2" deck screws  
3" deck screws  
Spray paint  
Spray primer

# CUTTING



Equipment you will need for cutting:

A skilsaw (portable circular saw), hand saw, or table saw  
A pencil  
A straightedge and/or carpenter's square (steel square)  
A level (bubble or laser line)

**Cutting the Interior Nesting Chambers**

Lumber you will need:

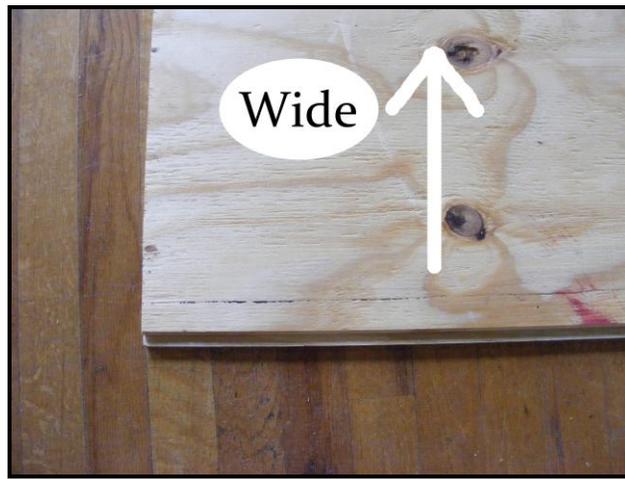
Two (2) 8'0" x 4'0" Textured-One Eleven (T1-11) boards of plywood



*Textured-One Eleven (T1-11) Plywood*

1. Each piece of T1-11 plywood will need to be cut into three (3) **narrow** sections and three (3) **wide** sections. The **narrow** will be measured in  $14 \frac{5}{8}$ " pieces and the **wide** will be measured in  $15 \frac{3}{4}$ " pieces. These **narrow** and **wide** pieces will be used to form the three boxes that make up your interior nesting chambers. In total, you will cut out six (6) **wide** and six (6) **narrow** pieces from two 8'0" x 4'0" T1-11 boards.
2. Place your first T1-11 plywood on a pair of sawhorses with the flat (or non-textured) side facing upward. ***Do not cut with the textured side facing the blade.***
3. Notice how the T1-11 plywood has two different types of edges on each side, one of them flat and one of them *ridged*, with one ridged edge flush with the flat side of the board and the other ridged edge flush with the textured side. As seen on the next page, the ridged edge that is flush with the flat side of the wood should be your upward direction. All of your pieces of T1-11

should have the upward direction clearly labeled; this will make assembling your nesting chambers easier and more intuitive with the use of the ridged edges.



*A ridged edge of T1-11 with the textured side facing up. The upward arrow works away from the ridged edge that is flush with the flat surface, facing down.*

4. Measure  $14 \frac{5}{8}$ " from the factory side of your T1-11 plywood and mark a straight line across it. This will be your first **narrow** piece. Cut out along your  $14 \frac{5}{8}$ " line, remembering to compensate for the blade. Check the length of all cuts afterwards to ensure that each piece is cut to the desired length.
5. Once completed, make sure you label with a pencil that this is a **narrow** (or 'N') piece. Also make sure that you label the upward direction.



*An arrow facing upward and a clear indication of either **narrow** or **wide** (with exact measurements).*

6. Using the same piece of T1-11 plywood, cut out two additional **narrow** pieces of wood at the  $14 \frac{5}{8}$ " measurement. You should now have three (3) **narrow** pieces.
7. With the rest of your first sheet of T1-11 plywood, measure and cut out a **wide** piece at  $15 \frac{3}{4}$ ", then measure and cut out two more **wide** pieces. You should be able to cut out three (3) **wide** pieces and three (3) **narrow** pieces from each T1-11 board.
8. Follow these same steps with your other T1-11 plywood, so that you finish with a total of six (6) **narrow** pieces and six (6) **wide** pieces.
9. Now take two (2) **narrow** pieces and two (2) **wide** pieces and trim off the bottom ridged edges of each piece (the edge opposite the arrows and flush with the flat side). When assembled, these four pieces will form your bottom nesting chamber, which should be totally flat on the bottom.
10. Make sure all pieces are labeled and have an upward direction indicated, then set them aside.

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### Cutting and Drilling the Ventilation Unit

<p><u>Lumber &amp; Equipment you will need:</u></p>
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<p><math>\frac{3}{4}</math>" plywood Drill</p>
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1. With your  $\frac{3}{4}$ " plywood, measure and cut a 15" x 15" square box. This will be used for the *ventilation unit*. Your ventilation unit will be a square of  $\frac{3}{4}$ " plywood with a grid on it. A series of  $\frac{1}{2}$ " holes will be drilled into each intersection of the grid. (See picture on the next page for Steps #2-7.)
2. Measure down 3" from the top-left and top-right corner of your ventilation unit and draw a straight line between your two measurements.
3. Measure  $1 \frac{1}{2}$ " down from your line and draw another straight line across the unit.
4. Follow Step #3 five more times so that you have seven (7) horizontal lines .
5. Now measure over 3" from the top-left and bottom-left corner of your ventilation unit and draw a straight line between your two measurements.
6. Measure  $1 \frac{1}{2}$ " to the right of your line and draw another straight line across the unit.
7. Follow Step #6 five more times so that you have seven (7) vertical lines. You should now have a 15" x 15" piece of  $\frac{3}{4}$ " plywood with seven (7) horizontal and seven (7) vertical lines and forty-nine (49) intersections.



*Pattern for the ventilation unit. Lines start 3" from each corner and are separated by 1 1/2".  
Your grid will form forty-nine intersections when finished.*

8. Using your drill and your  $\frac{1}{2}$ " wood-boring drill bit, drill a hole directly into the middle of each intersection so that you have forty-nine (49)  $\frac{1}{2}$ " holes with roughly 1" between each hole. Label the finished product as your *ventilation unit* and set it aside.



### **Cutting the Sun Collar**

Lumber you will need:

$\frac{3}{4}$ " plywood

1. Using the  $\frac{3}{4}$ " plywood, measure out and cut a  $17 \frac{1}{4}$ " x  $17 \frac{1}{4}$ " square box. This will form the platform for your sun collar at the very top of the tower. Do not worry that it is larger than your top nesting chamber; once you apply the braces to the side of your tower, the sun collar platform will fit perfectly.
2. With your sun collar platform, measure  $3 \frac{1}{8}$ " down and  $3 \frac{1}{8}$ " right from your top-left corner and make a mark. Using that mark as a guide, measure out an 11" x 6" rectangle in your sun collar platform with your mark acting as the top-left corner of your rectangle. Now cut out the rectangle to form a hole in your sun collar platform. If you are not comfortable doing a plunge cut with your skilsaw, you can make the same cut with a hand saw.



*A sun collar platform with a hole for the Chimney Swift to enter. A wood-boring bit was used in each corner to allow a hand saw to cut out a (relatively) straight line.*

3. This hole will form the doorway for the Chimney Swift birds entering your tower, so it is important that you sand all of the edges after cutting.
4. Again using your  $\frac{3}{4}$ " plywood, cut out two (2) pieces measuring  $13\frac{1}{2}$ " x 8" and two (2) pieces measuring  $8\frac{1}{2}$ " x 8". These four pieces will form the actual sun collar that sits atop the hole in your sun collar platform. (Do not worry that the hole is smaller than the sun collar box; a slight lip is desired to make sure the box fits on easily.)
5. Because of the siding on the rest of your tower, the sun collar is the only section that it is recommended to paint before installing. You will want to do that before assembly so that it can be painted easily and so that the paint settles quickly.
6. Label all pieces and set them aside.

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### **Cutting the Braces**

Lumber you will need:

Eight (8) twelve-foot 1" x 4" lumber

1. Measure and cut sixteen (16) six-foot pieces out of your eight (8) twelve-foot 1" x 4" lumber. These will form the braces that hold your nesting chambers together during assembly.
2. Because of the metal legs that will hold up your tower (see "The Legs and Foundation" on Pg. 3), you will need to notch an L shape out of eight pieces of your sixteen six-foot 1" x 4". These eight notched pieces will form the bottom braces; the un-notched pieces will form the top braces.

3. Take a piece of your cut 1" x 4" and measure out a 1 1/2" x 4'0" section. Cut out this section so that you form an L shape with your 1" x 4" lumber. Because of the angled-steel legs these will be placed against, it is safer to cut slightly outside of the line rather than inside.



*A six-foot 1" x 4" brace with a 1 1/2" x 4" section notched out of it.*

4. Repeat Step #3 seven more times so that you have eight (8) 6'0" pieces of 1" x 4" with a 1 1/2" x 4'0" section notched out of each of them. Label these eight notched pieces as your **Bottoms** and the other eight un-notched pieces as your **Tops** and set them aside. During construction, the notched bottom pieces will be placed flushed against your metal support legs to form the braces to your tower. The un-notched top pieces will be placed above the bottom ones to connect the middle and top nesting chamber.

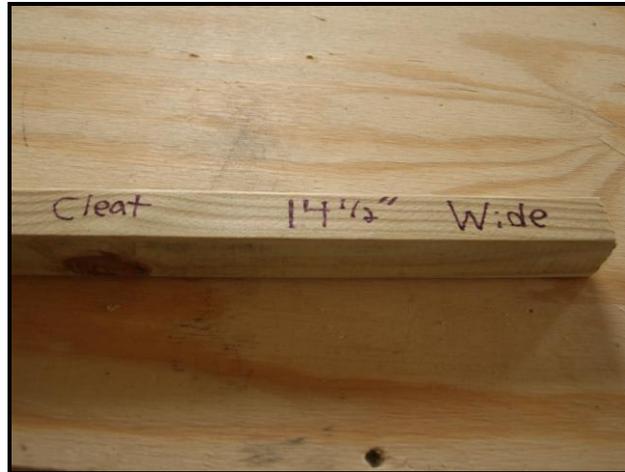
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### Cutting the Cleats

Lumber you will need:

One (1) eight-foot pieces of 1 1/2" x 1 1/2"

1. Using your 1 1/2" x 1 1/2" lumber, measure and mark a line 14 1/2" from a squared end. Cut out this 14 1/2" piece and label it '**W**' for **Wide**.



*A cleat, clearly labeled with measurements.*

2. Repeat Step #1 so that you have two (2) **wide** pieces of  $1\frac{1}{2}'' \times 1\frac{1}{2}''$  lumber measuring  $14\frac{1}{2}''$ .
3. Still using the  $1\frac{1}{2}'' \times 1\frac{1}{2}''$  lumber, measure, mark, and cut out two (2)  $11\frac{5}{16}''$  pieces and label them '**N**' for **Narrow**.
4. Make sure you label all four (4) pieces as *Cleats* and set them aside. They will form the supports on your bottom nesting chamber for the ventilation unit.



### Cutting the Foundation

Lumber you will need:

Two (2) pieces of ten-foot 2'' x 10'' lumber.

1. With one (1) of your 2'' x 10'' pieces of lumber, measure and cut two (2) 48'' pieces.
2. Then measure and cut two (2) 45'' pieces. You should finish with two (2) 48'' pieces and two (2) 45'' pieces of 2'' x 10'' lumber. These will be used to form a frame for your foundation. Label them and set them aside.

## Cutting the Rebar

Equipment you will need:

Hack saw

Eight (8) ten-foot  $\frac{3}{4}$ " pipes of rebar

1. Using a hack saw and a pen, measure and saw off sixteen (16) 40" sections of your ten-foot rebar. Be careful not to harm the metal teeth of the blade with hacking.
2. Now measure out and hack off eight (8) 12" sections from the remaining rebar. You should have sixteen (16) 40" and eight (8) 12" pipes of rebar. Keep all your rebar bundled and set them aside.



*12" rebar.*

# Construction



Equipment you will need for construction:

A drill (with various bits and pilot guides)  
A pencil  
A straightedge and/or carpenter's square (steel square)  
A level (bubble or laser line)

### Assembling the Interior Nesting Chambers

Equipment you will need:

1 1/4" screws

1. Begin by assembling the bottom nesting chamber. Clamp together all four sides with two **wide** pieces parallel to each other and two **narrow** pieces parallel to each other, thus forming a rectangular box with a square top and bottom. The flat sides of T1-11 boards should face the outside. You may want to place a **narrow** piece on the floor and then clamp two **wide** pieces to it. If you do not have four clamps, you can use the two **wide** (14 1/2") cleats as supports so that the nesting chamber does not collapse into itself. Make sure all ends remain perfectly flush and all of your upward arrows are pointing the same way. Your nesting chamber should be smooth on all sides.



*Use clamps to form a tight box out of your **wide** and **narrow** T1-11 strips. Notice the flat side is facing out with all arrows going the same direction.*

2. With an erasable pencil, make a to-drill mark on both sides of the **wide** T1-11 pieces starting at 1" from the bottom and top of your wood with 6" increments in between. These marks should

be roughly  $\frac{1}{4}$ " inside so that you can drill directly into the middle of the  $\frac{1}{2}$ " thickness of the **narrow** pieces. These screws will keep your T1-11 sides together.

3. Make sure that you use a pilot guide ( $\frac{3}{32}$ ") before drilling so that you do not splinter the wood. When ready, drill your pilot hole and then drill a  $1\frac{1}{4}$ " deck screw into every piloted hole. It is important that no screws breach the inside or outside of the box, as it is hazardous to both the Chimney Swift and you.



*Measuring roughly  $\frac{1}{4}$ " inside to make a pilot hole. Notice how these holes should screw from the **wide** boards into the **narrow** and should not pierce either the interior or exterior of the nesting chamber.*

4. Once all three of your nesting chambers are assembled, determine which box will form your top chamber, which will form your middle, and which will form your bottom (the bottom should already be trimmed (see Step #9 of "Cutting the Nesting Chambers" on pg. 8). Label each chamber and set them aside.

## Assembling the Ventilation to the Bottom Nesting Chamber

### Equipment you will need:

Drill

2" deck screws

1 1/4" deck screws

Four (4) 6'0" angled-steel legs

Spray Primer

Spray Paint

Two (2) **wide** cleats and two (2) **narrow** cleats.

Your bottom nesting chamber with trimmed ridges.

Your ventilation shaft.

1. Take your assembled bottom nesting tower and your four cleats. Start by fitting the two (2) **wide** cleats flush with the very bottom of the tower and sinking a series of 1 1/4" deck screw into the tops of each so that they are tight. Do not worry if the **wide** or **narrow** do not fit together into a perfect box; they are merely supports for the installation of the ventilation unit and do not need to entirely cover the edges of your bottom chamber.
2. Take your two (2) **narrow** cleats and screw them in between the **wide** ones so that you roughly form a box flush along the bottom of your nesting chamber.



*Securely screw the cleats into the bottom of the trimmed nesting chamber. Make sure the cleats are flush against the trimmed edge.*

3. Take your finished ventilation shaft and screw it directly into the cleats with the 2" deck screws. Do not worry that the ventilation shaft is not flush with the outside of the nesting chamber as long as it remains relatively center. Make sure not to drill into any existing screws.

### **Attaching the Steel Legs to the Bottom Nesting Chamber**

1. Using a safety mask and finding a remote location outside, set out your four (4) 6'0" angled-steel legs and spray all sides with your spray primer and then your spray paint. Leave plenty of time in between each coating to make sure the primer and paint fully settle.



*It is always recommended to use a safety mask and to be outdoors when using any kind of spray paint.*

2. Once the paint has settled, secure one of your angled-steel legs so that it is ready for drilling. Measure down 2" from the top of the leg, then make markings on the **inside corner** of the steel every 6" down and 1 1/4" in until you reach roughly 3". It is strongly recommended that you place your angled-steel leg up against the side of the box you plan to drill it into and check that no screws will overlap when drilling into the chamber.
3. Use a 3/16" metal-cutting bit and drill pilot holes into your legs along each of your markings.



*Use a metal-drilling bit to pilot a hole through the angled-steel legs. This will allow you to drill the legs into the bottom nesting chamber.*

4. Repeat Steps #2 and 3 for the remaining three (3) angled-steel legs.
5. Once you have made pilot holes in all of your legs, gather up all four angled-steel legs and your bottom nesting chamber. Make sure the ventilation unit has been screwed in before attempting to attach your legs.
6. Place one of the angled-steel legs up against a corner of your bottom nesting chamber so that it is suspended exactly three feet from the bottom of the ventilation shaft. If you are using angled-steel of any other height than 6'0", it is important that the legs are always suspended exactly three feet from the bottom of the ventilation shaft. Clamp down the leg once it is in the desired position.
7. Use a  $\frac{3}{32}$ " bit to pilot into each of the holes through your angled-steel legs and into your nesting chamber. Then drill 2" deck screws into each of the pilot holes, making sure never to penetrate either the inside or the outside of your box with the screws.
8. Once you have securely screwed in the first leg you may screw in the other three (3) at different corners of your bottom nesting chamber. It is important that all four (4) legs are each suspended **exactly** 3'0" from the bottom of the nesting chamber so that when placed vertically, all four of the legs are flush with the surface.
9. Finish installing the remaining legs, then set the nesting chamber aside.

## Assembling the Foundation Box

### Equipment you will need:

Drill

3" deck screw

Two (2) 48" pieces of cut 2'0" x 10'0"

Two (2) 45" pieces of cut 2'0" x 10'0"

1. Using your cut 2'0" x 10'0" lumber, assembled the two **wide** pieces parallel to each other and the two **narrow** pieces parallel to each other so that you form a box with your lumber. Clamp the box together.
2. Once clamped into place, use 3" deck screws to screw the **wide** pieces into the **narrow** ones. This will form the foundation box that you pour your concrete into, so it is important that the box is perfectly secure. Sinking two (2) 3" deck screws into each corner should provide all the stability you need.



*Forming a box out of your cut 2" x 10".*

## Assembling the Sun Collar

### Equipment you will need:

Drill

2" deck screws

One (1) 17 1/2" x 17 1/2" piece of 3/4" plywood (already cut).

Two (2) 8" x 13 1/2" pieces of 3/4" plywood (already cut).

Two (2) 8" x 8 1/2" pieces of 3/4" plywood (already cut).

1. Using two sets of clamps, clamp together your two (2) 8" x 13 1/2" pieces and two (2) 8" x 8 1/2" pieces of 3/4" plywood so that they form a rectangle. The wider 8" x 13 1/2" pieces should press against the narrower 8" x 8 1/2" pieces.
2. Pilot two holes into each of the four corners of your rectangle and then use the piloted holes and 2" deck screws to screw the rectangular sun collar together. Remember to screw from the wide pieces into the narrow pieces, avoiding piercing either the interior or exterior of the wood.
3. Now place the assembled sun collar atop the hole in your sun collar platform. There should be a slight lip so that the bottom of the sun collar is not perfectly flush with the hole.
4. Pilot and screw 2" deck screws into the bottom of the sun collar platform so that they tightly hold the entire sun collar together.



*Assemble the sun collar box onto the sun collar platform.*

# Foundation (on location)



Equipment you will need for shoveling:

One or more shovel(s)  
A hammer or mallet  
A level (bubble or laser line)  
Twenty (20) bags of quick-drying concrete (QuickCrete)  
A wheelbarrow  
Access to a steady flow of water

Eight (8) 12'' pipes of rebar  
Sixteen (16) 40'' pipes of rebar  
Your bottom nesting chamber with attached angled-steel legs  
One (1) Foundation Box of 2'' x 10'' lumber

**Digging the Foundation**

1. Once at your location, find a good spot for your Chimney Swift tower. Some considerations include: level ground, not having overhanging branches that predators could use to get into the top of the tower, and proximity to nearby buildings (Chimney Swifts form a more comfortable niche in a tower that is close to a building ). Because the Chimney Swift will more readily enter a chamber that is facing due North, you should install the hole to your sun collar (and therefore ensure that one side of your foundation box is) facing due North.
2. Place your foundation box at exact center in the area you plan to dig. Once securely in place, dig into the ground roughly three inches around the foundation box so that you form a visible indent in the earth. This will create the perimeter of your foundation hole.



*Preparing to dig a perimeter around the foundation box.*

3. Remove the foundation box and dig out a three-inch-deep hole in the ground. Keep the hole as perfectly level as possible, as the entire tower will lean if the foundation is uneven.

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### Laying the Foundation

1. Once you have a 3''-deep hole, place the foundation box back in the center of the hole. Make sure it is level on all sides.
2. Once level, fill up the outside of the foundation box with dirt so that no concrete will escape from underneath it. Check to make sure it is level again.



*A level foundation formed on an uneven, hilly surface. Notice a bubble level is used to ensure that the entire foundation is level.*

3. Now place your bottom nesting chamber with attached angled-steel legs into the center of your foundation box. Again, make sure both the bottom nesting chamber and the foundation box are level on all sides before proceeding.
4. Drive your four (4) 12'' pipes of rebar roughly 6'' from each of the four corners of your foundation box. The rebar should rest 1'' below the top edge of your foundation box.
5. Drive the remaining four (4) 12'' pipes of rebar into the midpoints of each side of your foundation box, again making sure they rest 1'' below the top edge.
6. Use two (2) 40'' pipes of rebar and tie wire to create two layers of rebar that securely tie together two adjacent angled-steel legs of your nesting chamber. The 40'' pipe should stick out on both sides past the angled-steel legs.
7. Connect the remaining three legs together so that you form a box out of eight (8) pipes of 40'' rebar, securely fastening the legs together.

8. Follow this same pattern on the inside of the foundation box, using the remaining eight (8) 40'' pipes of rebar to tie together the eight 12'' pipes of rebar in a box shape. (See picture on next page for detailed view.)



*A foundation pattern with rebar installed.*

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### **Adding QuickCrete to the Foundation**

1. Begin mixing your concrete and water into a wheelbarrow, making sure to thoroughly stir the contents together. You will have to be expedient with this process as you do not want the concrete to settle in your wheelbarrow. Also try not to overload your wheelbarrow by putting in too many bags.
2. Pour or shovel your mixed concrete into the foundation. Continue adding concrete until you reach the top of your foundation box. This should take anywhere from fifteen to twenty bags of QuickCrete.
3. While one team is mixing new concrete, the remaining group should continue stirring the concrete settling inside the foundation box while carefully leveling it off. Once you have poured all of the concrete into your foundation box, finish off by making sure that the top of your foundation is as flat as possible.



*Stir the concrete in your foundation box so that none of it settles prematurely.*

4. Allow to settle for anywhere from eight hours to two days, depending on the integrity of your concrete.

# Assembly (on location)



Equipment you will need:

A drill  
2" deck screws  
1 ¼" deck screws  
A hammer or mallet  
An exacto knife  
A pair of wire cutters  
Three or more tubes of liquid nail adhesive  
Insulation  
Siding (including five (5) pieces of ten-foot corner siding)  
Two (2) twelve- or fifteen-foot ladders  
  
Three (3) assembled nesting chambers  
Eight (8) notched wooden 1" x 4" braces  
Eight (8) un-notched wooden 1" x 4" braces  
One (1) assembled sun collar

**Assembling the Bottom and Middle Nesting Chamber**

1. After your concrete has settled, your bottom nesting chamber should be firmly cemented into the foundation. If you do not feel confident with the stability of your concrete then **do not work on your tower**. Patience is a virtue.
2. When your concrete is settled, place the middle nesting chamber on top of the bottom nesting chamber. You will need at least two ladders and four people to pass up and settle the middle chamber into place. Make sure you place a **Wide** section on top of another **Wide** section so that the grooves fit in together.
3. Using the ridged edges of your T1-11 plywood, your two chambers should fit together relatively easily. Use a hammer or mallet to gently tap the two chambers together.

**Attaching the Braces**

1. Begin placing your eight (8) six-foot 1" x 4" notched braces up against the angled-steel legs. The notched section of the braces should fit snugly with the angled-steel legs. Your braces will only go halfway up the middle nesting chamber as the second half of the middle chamber will be taken up by the un-notched braces later in assembly. Use multiple clamps or extra workers to hold the braces securely into place.



*Assembling braces against the edges of two connecting nesting chambers.*

2. Pilot holes roughly 6" from the bottom of the legs into the sides of the nesting chambers, making sure not to screw into any other screws or to pierce the inside or outside of the chamber. Since you can only pilot holes into the very corner of the nesting chamber, you will not be able to make any pilot holes alongside the angled-steel legs as you will puncture the T1-11 plywood and risk injuring the birds. For extra stability, pilot a hole at the very bottom of your wooden brace directly next to the angled-steel legs and using the still-in-place wooden cleat inside the nesting chamber to make sure you don't pierce the interior.
3. Use 1 ¼" deck screws and attach the braces to your nesting chambers using your pilot holes.



*Two assembled nesting chambers with braces. Notice the screws on the far corner of each edge, roughly 1/4" inside.*



### Assembling the Middle and Top Nesting Chamber

1. Once your middle chamber is securely fashioned into the bottom one, you should be able to put your body weight against the existing chambers without risk of falling or injuring the tower.
2. Place the top chamber on top of the middle chamber, again malleting or hammering it into place so that they fit snugly. Remember that a **Wide** side of your chamber must rest atop another **Wide** side of your chamber.

### Attaching the Braces

1. Use your remaining eight (8) un-notched wooden braces, placing them snugly atop the existing braces and flush alongside the edges of your nesting chambers.
2. Pilot holes into the sides of each of your un-notched wood roughly 6" apart, making sure to avoid existing screws and piercing the interior or exterior of your chambers by drilling no farther than  $\frac{1}{4}$ " from the edge.
3. Use  $1\frac{1}{4}$ " deck screws and attach the braces to your nesting chambers using your pilot holes.

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### Adding the Insulation

1. Take your 8'0" x 4'0" sheet of insulation and cut out twelve (12) pieces measuring 4'0" x 8  $\frac{1}{2}$ " with your exacto knife.



*Four insulation strips (4'0" x 8  $\frac{1}{2}$ " )*

2. Using your liquid nail adhesive, glue the non-flashing side of your 4'0" x 8  $\frac{1}{2}$ " insulation in a zig-zag pattern so that you cover a wide surface area.

3. Place the insulation flush between the two brace boards of all four sides of your tower with the flashing side facing out. Liquid nail adhesive takes constant pressure to properly bond, so make sure to take your time with application.



*Use direct pressure to attach the siding.*

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### **Adding the Siding**

1. Use wire cutters to cut out fifty-six (56) 15'' strip from your vinyl siding.
2. With one of your ten-foot pieces of corner vinyl siding, cut out four (4) 2'0'' strips. You should now have four (4) 10'0'' and four (4) 2'0'' strips of corner vinyl siding.



*Cut corner vinyl siding so that it fits atop the tower.*

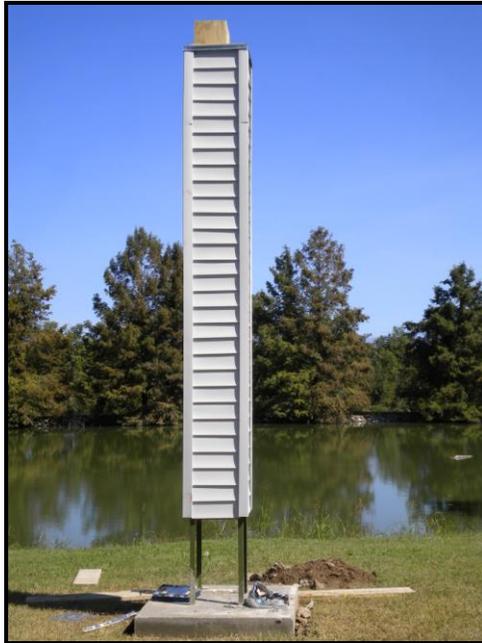
3. Starting at the bottom of the tower, secure one of your 10'0" corner vinyl siding strips against a corner of your tower, then place a 15" strip of regular vinyl siding along the nail holes in the side of the corner vinyl siding strip so that they both sit flush with the bottom of the tower. Once secure, nail the overlapping siding into your tower.
4. Continue nailing corner vinyl strips and regular vinyl strips up the inside of the tower for all four sides. Use your four (4) 2'0" corner vinyl strips for the top of the tower where the ten-foot strips cannot reach.

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### **Adding the Sun Collar to the Top Nesting Chamber**

1. Because the sun collar was wider than your tower, you could only assemble it once the braces had been attached.
2. Using a secure ladder and a spotter, place the sun collar atop your tower flush with each of the four corners of your braces.
3. Pilot two holes into each corner of your sun collar, making sure not to pierce the inside or outside of the wood.
4. Use 2" deck screws and attach your sun collar to the top of your tower using your pilot holes.

# Congratulations!



*A Chimney Swift tower.*

With the addition of your sun collar, you have now finished assembling your very own Chimney Swift tower and done your part to help strengthen our environment. The National Audubon Society, the National Civilian Community Corps, and nature enthusiasts everywhere applaud your efforts.

Though finished, there are still some final touches you can add to your tower. If you didn't use vinyl siding then it is strongly recommended that you use a flashing type of flexible metal to create a predator guard on the top of your tower. The predator guard will prevent invasive creatures from scaling the tower and entering the sun collar. You might also want to get a special type of bug spray to use on the leggings so that insects don't eat away at the T1-11. The ventilation unit should be routinely removed so that waste can be removed from the bottom of the tower. You could also decorate your tower or paint it white so that it absorbs less heat.

For now, though, you should take a moment to pause and appreciate your accomplishment. Congratulations on a job well done.

## **Appendix**

National Audubon Society – The National Audubon Society is an environmental organization that aims to conserve and restore natural ecosystems, focusing on birds, other wildlife, and their habitats for the benefit of humanity and the earth’s biological diversity. Their dedication to the preservation of the Chimney Swift bird and their interest in funding and overseeing the construction of these towers was vital in helping encourage the growth of the bird’s niche.

AmeriCorps NCCC – AmeriCorps NCCC (National Civilian Community Corps) is a national program whose mission is to strengthen communities and develop leaders through team-based national and community service. AmeriCorps members are between the ages of eighteen and twenty-four and focus on a variety of service-related tasks instrumental in developing communities.

This specific documentation was provided by the River One team of Class 16, stationed out of the Vicksburg, MS campus. The construction of four Chimney Swift towers that were used to test this document took place with the extreme generosity of our host, the Southern Cultural Heritage Center in downtown Vicksburg.