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HOW TO BUILD A courtyard DECK

The elevated, U-shaped structure of this home left an unusable patch of land between the wings containing the main family living space and the children's playroom. The new courtyard deck not only links the wings, but also creates a shaded and private outdoor room, to be enjoyed by family and friends.

fact file

SKILL → **high**

SWEAT → **medium**

COST (2 PEOPLE)

D.I.Y. – **7 days** **$7,205**

HAVE IT DONE – **5 days** **$10,600**

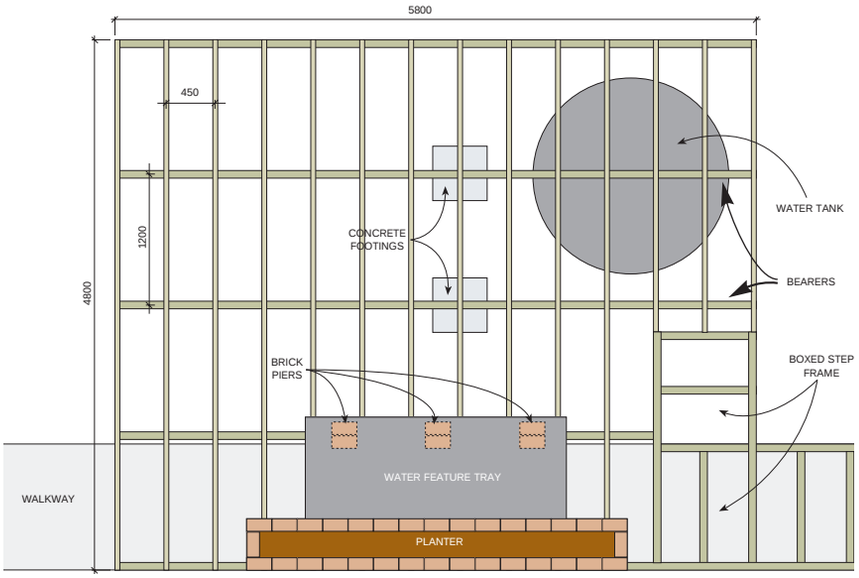


DIAGRAM 1
DECK LAYOUT

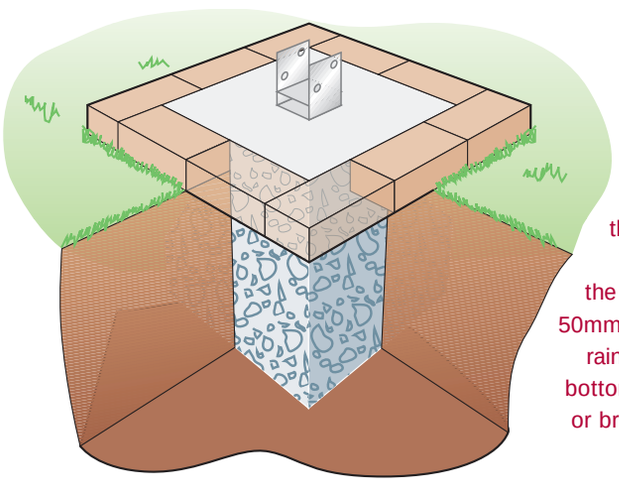


DIAGRAM 2
FOOTING SURROUND

TIP: When pouring footings, a small timber frame (or even a border of old bricks) can be placed around the top perimeter of the hole to act as a formwork. This way, the surface level of the concrete can be finished 45-50mm above ground level, allowing rainwater to drain away from the bottom of posts. Knock the timber or bricks away when the concrete has started to cure.

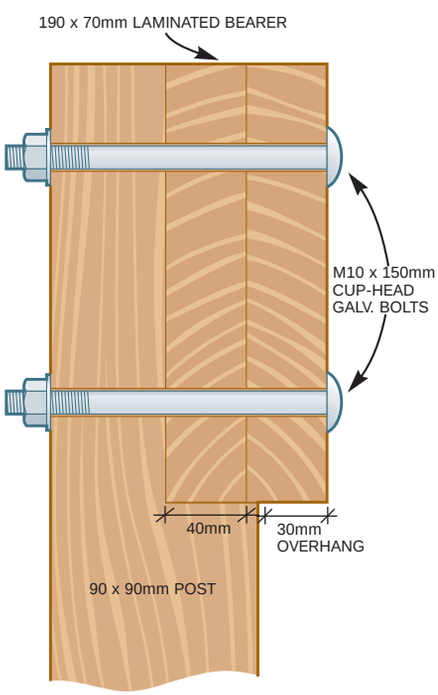
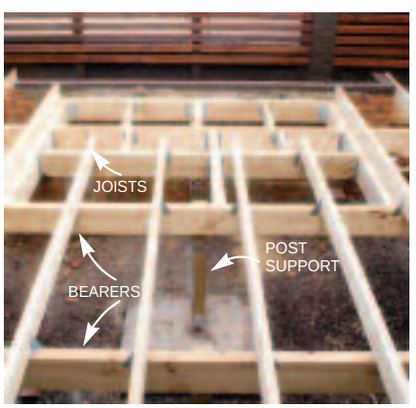


DIAGRAM 3
POST HOUSING

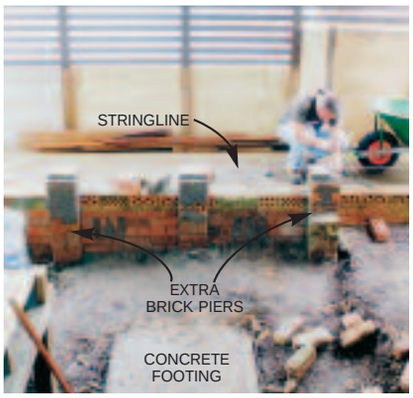
TIP: To give the deck sufficient support over the given spans, we used 190 x 70mm laminated treated pine bearers. These are made by gluing two pieces of 35mm timber together, under pressure. The grain directions are alternated, making the laminated piece much stronger than single 70mm-thick timber. Lamination allows the manufacture of much longer and more stable bearers than would otherwise be possible.

1 The U-shape of the house allowed the deck to be supported on three sides by the existing structure, thus minimising the need for support posts. The elevated deck also covered an existing, but obsolete, walkway and created the perfect hiding place for a 5,000-litre water tank. (Diagram 1)

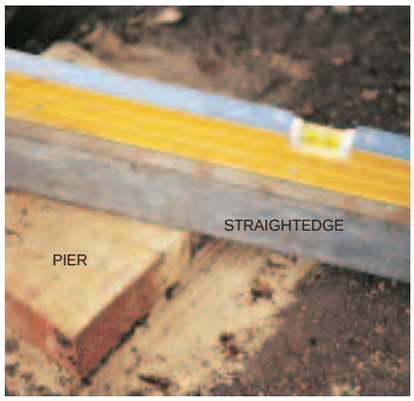
TIP: If you're a novice at small bricklaying jobs, make a brick gauge to guide the level of each course. Transfer the mortar joint marks from a quality brick wall onto your brick gauge and you're set to spread some mortar. Bed the bricks in place to match the gauge.



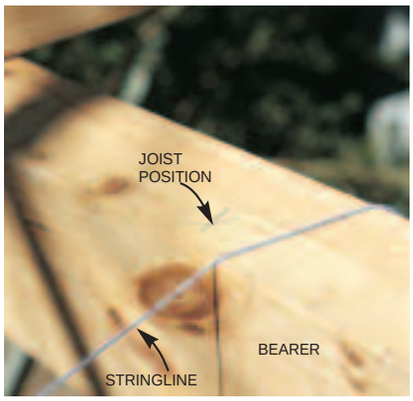
5 We positioned the 140 x 45mm treated pine joists perpendicular to the bearers, and spaced at 450mm centres. Each joist was fixed to the bearer below, using a single, galvanized, triple-grip tie bracket at each crossover point. These brackets are designed to connect timbers positioned a 90º angle to each other. (Diagram 4) Triple-grips come in both left and right configurations and nail to the side of the joist, and the top and side of the bearer. For this deck, the brackets were alternated from left to right, at each intersection along the joist, to help keep the joist upright and plumb. The ends of the joists extended beyond the last bearer to a ledger connected to the brick boundary wall. These overhanging sections were further supported with the aid of small timber stands. Galvanized angle brackets were bolted to the concrete, and to the inside of the joists, to keep them firmly locked in place.



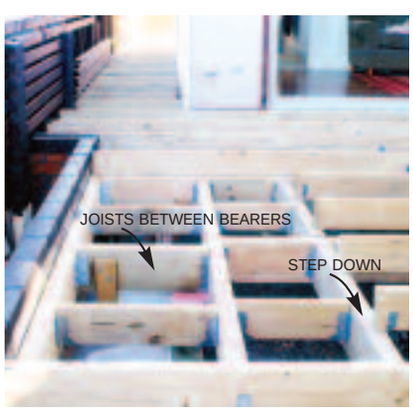
2 The height of the deck was aligned with the floor level of the house. We attached stringlines, at bearer height and at 1200mm centres, between the wings, and then spanned the space. As the stone water feature weighs in at over a tonne, we planned to position an extra bearer underneath it to ensure that it was well supported. We set an extra stringline to mark this bearer position. After working out the positions of the timber posts and brick piers, we marked their locations on the stringlines. We then dropped a plumb-line to the ground at these marks, to determine the position of the footings. Using a posthole shovel, we dug 400mm-deep holes for the blob footings and then filled them with concrete.



3 The varied nature of the site meant a range of bearer supports were used. The height of each support was determined by measuring to the ground from the stringlines, and the base of each mounted into a galvanized post support, dynabolted to the footings. The first bearer was supported on 90 x 90mm treated pine posts, bolted to the side of existing piers up against the house. The two central bearers were also supported by 90 x 90mm treated pine posts. The outer bearer, which spanned an existing brick and concrete walkway, was supported on three brick piers, to carry the weight of the water feature. We spanned a straightedge topped with a spirit level from pier to pier, to check for level.



4 We cut 190 x 40mm housings on the top of each support post to carry the bearer (Diagram 3). We then drilled 10mm clearance holes and bolted them together. We created additional support at the ends of the bearers by extending them under the house, and securing them to the side of the sub-floor bearers with steel brackets. We topped the brick piers with damp course and ant capping, then positioned the outer bearer on top. A ledger was fixed to the boundary wall to carry the ends of the joists and allow the deck to continue as a walkway to the backyard. When all the bearers were in place, we checked for level and then used a taut stringline to mark the joist positions on top of the bearers.



6 We created a level change in the deck sub-frame, to form an entry step and a step down to the water feature trough. We achieved this easily by lowering some sections of the joists so that they ran between the bearers (like noggings in a wall), rather than over them. As the joists are 140mm-deep, this effectively created a 140mm step down. We used joist hangers to support the sections of joists between the bearers (Diagram 5). If installed correctly and with the specified fasteners, joist hangers are incredibly strong. All treated pine framing timbers, and Pryda brackets and ties, are available from Bunnings Warehouse. Cut the 9mm marine ply to fit the base of the step-down area, and then fix the ply directly to the bearers and joists, using construction adhesive and stainless steel screws. Lay the rubber pond liner in the reservoir and fold the corners neatly, before positioning the galvanized trim.

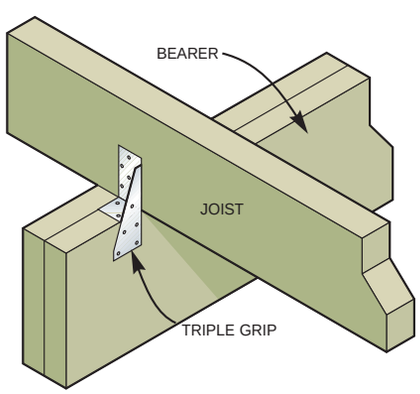


DIAGRAM 4
TRIPLE GRIPS

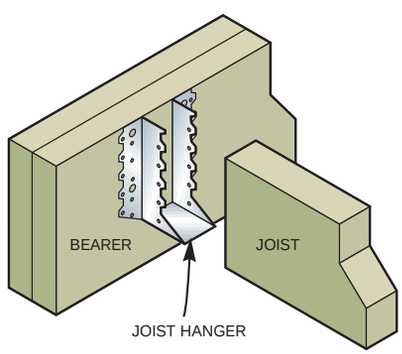
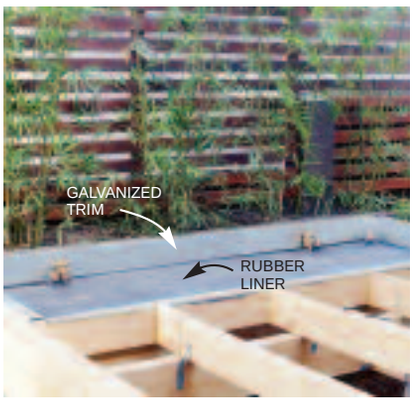


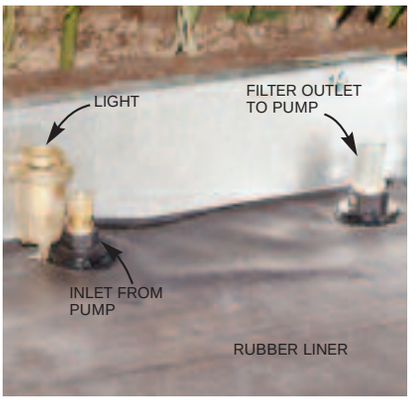
DIAGRAM 5
JOIST HANGER

check before you build

Ask your local council about relevant regulations. Detailed plans, as well as development and building approvals, may be required. Draw a plan of the deck, showing all dimensions, including heights above ground level and footing locations. Check before you start to ensure that your post sizes, bearer and joist spans meet regulations. See Australian Standards AS1720 and AS1684.



7 A lined box formed the base reservoir for the water feature (see Water Feature Set-up, below). A rubber liner was laid in the prepared box, after carefully checking for sharp edges or protruding screw heads. The trim was made from flat galvanised sheet metal, bent to size and shape by a local roofing supplier, and makes it appear that the trough is made of metal. The metal surround sits 15mm clear of the base of the reservoir, so as not to cut into the rubber liner.



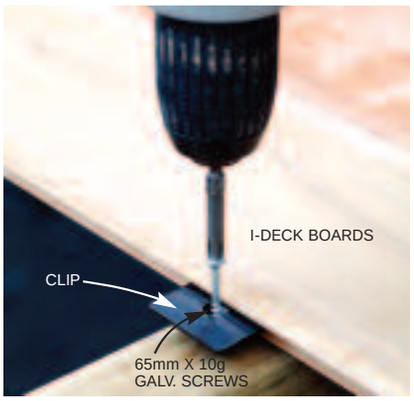
8 We drilled holes in the base, through the marine ply and rubber, to accommodate a water inlet, a water outlet, and a pair of underwater feature lights. The brass fittings were all mounted using a plastic flange, covered with silicone sealant, and then tightened, to form a waterproof seal. With the tray in place and access to the underside still easy, we installed and tested the water pump and low-voltage lighting transformer. Visit lumascape.com.au for more lighting info.

9 Before installing the troughs, we tested them to establish overflow points and correct levels. A great deal of muscle was enlisted to lift the troughs, slowly and carefully, into their correct positions. Feeder tubes were fitted into each trough, then sealed and connected, before filling the remaining space inside the tray with river stones. A variety of pepples and riverstones is available from landscape supply centres and your local Bunnings, or check the Yellow Pages under 'Pebble Supplies'.

water feature set-up

The water feature was constructed by assembling a 2400 x 950mm frame, using 140 x 45mm treated pine. We fitted a 10mm marine ply panel onto the base framework and secured it with construction adhesive and stainless steel screws, buried well into the ply. Once this wooden tray was complete, we installed a rubber lining. Rubber pond liners can be purchased from good landscaping and specialist pond supply stockists or your local Bunnings Warehouse. Antique, hand-carved granite troughs, sourced from overseas, were to be the main feature of this pond, but any number of locally available alternatives would be equally interesting.

Metal fasteners Metal ties and brackets are available in both galvanized and stainless steel. They are engineered to give strength to timber connections – without the need for complicated joinery. Available in a vast array of shapes and configurations, they'll suit most standard timber dimensions and will simplify even the most complicated timber-connection situations (view the full range at www.pryda.com.au).



10 Align the first decking board to a set stringline and then screw-fix in place. All the other boards are then pushed into place over the secured clips. The clips are inserted into the groove on the opposite side of the board, and over the centre of each joist, and then screwed into the joist, clamping the deck board firmly into place. Repeat the process, with each new board fitting into the clip that secured the outer edge of the previous board, until all the decking has been laid.

11 The decking was designed to overlap the edges of the water feature by 20mm on all four sides, to cover the galvanized trim and disguise the inner structure of the water feature. The front decking strip laid out perfectly without any further trimming necessary. The decking ends were trimmed square using a circular saw, with a straightedge as a guide. The rear decking strip was ripped to a width of 50mm before screw-fixing in position. We lightly sanded all the cut edges before applying the finish.

12 One corner of the deck continues as a walkway, while the other steps down to an existing pathway. At the step down, the boards were trimmed flush to the joist, allowing a solid vertical timber trim to be installed up to surface level. This trim board concealed the decking's end grain and the secret of the I-deck profile. Adding solid Ironbark step risers and side panels trimmed each boxed step section neatly. The decking boards were run in alternate directions, to clearly and safely define each level.

deck

The decking selected for this job is a relatively new product called 'I-Deck'. It features extra-wide, 135mm boards, fastened with a hidden clip system. This clean, modern clip system means there are no surface fixings required and deck-board spacing is evenly controlled. I-Deck is cut and machined from sustainable hardwood and is available in cream, red and brown colourings. We chose Ironbark for our courtyard deck, for its durability and warm red/brown tones. For more information or supply, contact Hardwoods Australia www.hardwoodsaustralia.com.au

I-Deck boards are machined with a hidden groove down each side. These grooves are designed to accommodate a clip that, in turn, holds the board in place (Diagram 6). To lay I-Deck, the first board must be screwed along its outer edge. The screw holes can be hidden with timber plugs. The small plastic clips then push into the groove on the opposite side of the board, directly above the joists. Tap lightly with a rubber mallet, to ensure the clips are bedded in correctly. The clips are then secured to the top of the treated pine joists, using 65mm x 10g galvanized screws. Use 50mm x 8g galvanized screws when fixing hardwood, and use stainless steel screws if you live close to the ocean.

The grooves on either side of the decking board are shaped differently, and the clips are one-directional. This means that once the first board is laid, all the others must run the same way. The boards and clips are designed this way so that the screw heads will be covered by the next board. As the joins are bevelled, the gaps look invisible from directly above.

Before securing, the edges, grooves and underside of the boards were given a coat of decking oil, to help seal and protect them. By sealing the underside of the decking, as well as the top, you'll protect it from condensation and ensure a more even intake of atmospheric moisture – minimising the chances of cupping.

13 To obtain maximum protection from the oil finish, we applied three coats, 24 hours apart. Each coat was applied liberally with a brush (or use an applicator pad), and allowed to absorb into the timber's pores for about twenty minutes, before rubbing off any excess with a soft rag. To maintain this level of protection, a refresher coat of oil should be applied about once a year, as part of your home maintenance.

14 To finish, the stone water feature was backed by a living bamboo screen, planted in the raised brick planter bed. The bed was waterproofed before soil and plants were added. When viewed from inside, the water feature and bamboo become a focal point, inviting you outdoors to relax in your new leisure area.

DRILLING STONE

Elevate and support the granite troughs above the ground and drill 20mm-diameter holes in the base of each. Set your electric drill to the hammer setting and use a 20mm masonry bit to drill angled holes at the base and the back of each trough. Then insert the plastic tube through the holes in the troughs, to connect the water reservoir with the pump inlet. Once completed, this tube will feed a constant stream of water into the base of each trough, causing it to overflow gently. The water spilling down the sides of the blocks runs back into the reservoir.

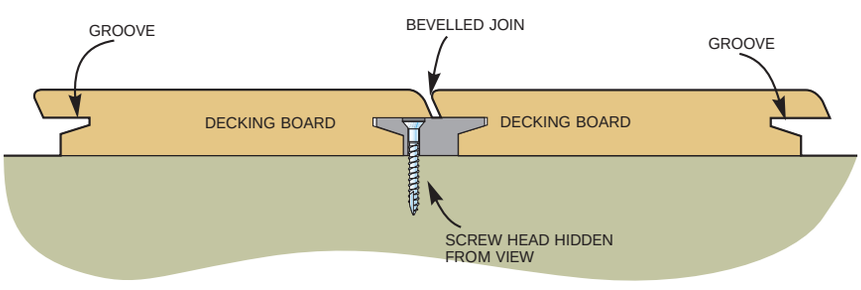


DIAGRAM 6
I-DECK IN PROFILE

oil finish

The deck surface was finished by applying three coats of Organoil's natural decking oil (see www.organoil.com.au). This product is rich in pure Tung oil, a natural preservative and waterproofing agent for timber. Tung oil is extracted from the nut of the Chinese Tung tree and has been used in China for hundreds, if not thousands, of years, to seal decorative and marine timbers. Although there are natural drying additives in this decking oil blend, the Tung oil itself is a drying oil, meaning that it cures by oxidisation, rather than evaporation, and will not fill your home with chemical fumes. The 'natural' or clear colour of the oil served to highlight the tight-grained features and colours of the Ironbark decking beautifully.

TOOLS

- 25mm chisel
- Builder's square
- Chalk line
- Circular saw
- Drill and drill bit set plus 20mm masonry bit
- Water level
- Electric plane
- Hammer
- Handsaw
- Jigsaw
- Measuring tape
- Mitre saw (sliding compound)
- Paintbrush
- Posthole digger
- Sawhorses x 2
- Sliding bevel
- Socket set
- Spirit level
- Steel trowel
- Stringlines
- Utility knife
- Wheelbarrow

Safety tip Rags soaked with oil, turpentine or other flammable liquids, can spontaneously combust if not disposed of correctly. Spread rags out in the sun to dry thoroughly before discarding.

MATERIALS (all measurements in mm)

PART	MATERIAL	QTY.	UNIT COST ($)	TOTAL ($)
DECK				
Footings	20kg concrete mix	10 bags	5.10	51.00
Ledger	90 x 45 treated pine	1/6000	5.45	32.70
Piers	Bricks and mortar	3 piers	7.00	21.00
Post supports	90mm galvanised	2	4.80	9.60
Posts	90 x 90 treated pine	3/1000	11.90 l/m	35.70
Bearers	190 x 70 laminated treated pine	4/6000	22.75 l/m	546.00
Joists	140 x 45 treated pine	8/5100 6/4200 10/1200	7.26 l/m	566.28
Decking	135 x 22 Ironbark I-deck – includes clips	30m^2	115.00m^2	3,450.00
Screws	65 x 10g galvanized screws	1 box x 1000	69.20	69.20
Bracket	60 x 60 x 140 angle bracket	12	3.51	42.12
Bracket	Pryda triple-grip	23 left, 23 right	0.80	36.80
Bracket	140 x 45 galvanized joist hangers	26	2.71	70.46
Clouts	35 x 3.15mm	4 x 500g box	10.52	42.80
Oil	Organoil natural decking oil	10L	180.00	180.00
Gal. dynabolts	125 x 12mm	12	4.10	49.20
Cuphead gal. bolts	M10 x 150mm	18	1.40	25.20
WATER FEATURE				
Trough frame	140 x 45mm treated pine	2/2400	7.26l/m	47.91
Trough base	9mm marine ply	2/900 2400 x 950	0.98/sheet	98.00
Liner	Rubber pond liner	3 metres	33.50/m	100.50
Metal trim	Galvanized barge capping	6.8 metres	33.00	33.00
Underwater lights	Lumascape brass pond lights	2	145.00	290.00
Transformer	1000va low-voltage	1	175.00	175.00
Pond pump	2400L p/h Resen King 3F	1	128.00	128.00
Granite troughs		2	500.00	1,000.00
Stones	River pebbles	2 bags	40.00	80.00
Plastic tube	10mm tube	2 metres	1.10	2.20
Stainless screws	50mm	25	0.90	22.50
			TOTAL	**$7,205.17**

Special thanks to Carl and Carlu Seaver for their co-operation in the development of this story.