



Install water features

AHCLSC309

By the end of this topic, you should be able to:

- Plan and prepare work
- Set out and prepare the site
- Install water feature and accessories
- Check quality of work and clean-up site

You will be directed to complete a number of activities during this presentation.
Compile your responses into one submission and email your work to training@cstc.org.au
with the subject 'AHCLSC309 Activities'

Water features

- There are a range of water features that may be built, including:

Waterfalls



Ponds



Waterways



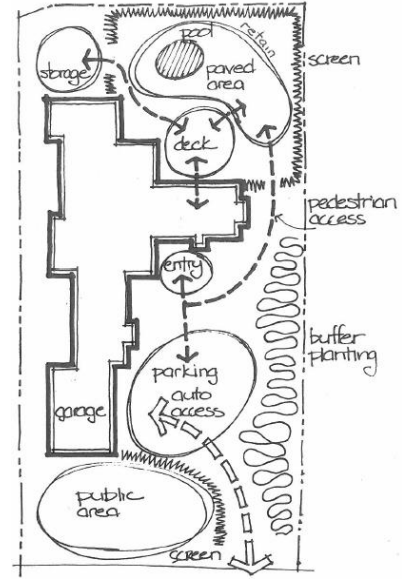
Fountains



Plan and prepare work

- To prepare for water feature projects, you should interpret plans and specifications
 - Landscape concept plans
 - These are a visual record of ideas
 - Usually rough freehand drawings

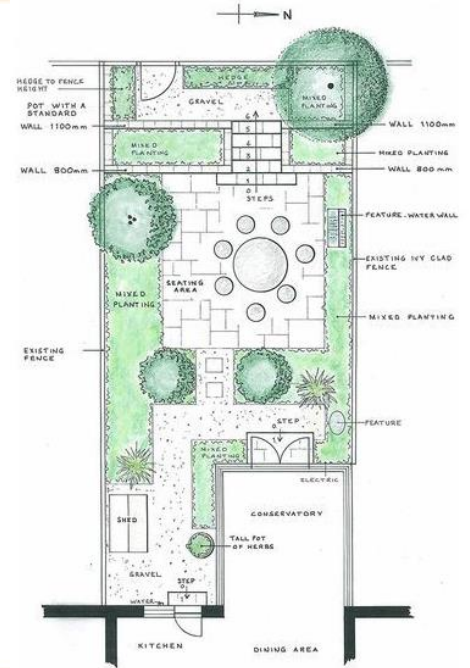
Activity 1: Draw a simple concept plan for a proposed landscape design which includes a water feature



Plan and prepare work

- To prepare for water feature projects, you should interpret plans and specifications
 - Landscape plans

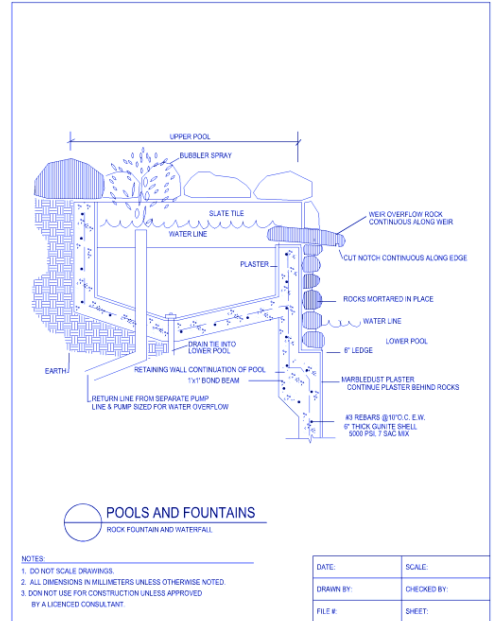
Activity 2: Identify/list the detail on the landscape plan shown



Plan and prepare work

- To prepare for water feature projects, you should interpret construction details
 - Details the components of a structure and how they fit together
 - Provides material symbols

Activity 3: List the materials required for the water feature construction plan shown



- To prepare for water feature projects, you should familiarise yourself with the task requirements
 - Required materials, tools and equipment
 - Proposed site of water feature
 - Location of services
 - Measurements
 - Drainage requirements

Plan and prepare work

- The materials to be used for water feature projects will differ depending on the work to be completed.
- However, some common materials include:
 - Bedding materials
 - Rocks and gravel
 - Pipes
 - Pumps
 - Concrete
 - Waterproof membrane

Crusher dust



Coarse sand



Decomposed granite



It is your responsibility to check the quantities and quality of materials matches the specifications

- With regards to pipes, most of the water feature may be done with PVC (poly-vinyl-chloride) pipe.
 - Plastic is ideal to avoid corrosion and poisoning
 - Schedule 40 (rated 400 pounds per square inch) is recommended for adequate strength/thickness.
 - Flexible PVC pipe that may also be used and joined to rigid with a special solvent.
- With regards to pipe sizes:
 - Never size down an intake or discharge line.
 - The size of the fitting at the volute (outer casing of the pump) should not be made smaller. This will reduce flow and motor life and increase energy costs.
 - Overflow and drain lines should be oversized, especially if there is a long run with a number of turns.

Plan and prepare work

- To prepare for water feature projects, you should organise required PPE, machinery, tools and equipment
 - **PPE may include:** Face mask, gloves, goggles, ear protection, long pants, sleeved clothing, wide brimmed hat, work boots
 - **Safety equipment may include:**
 - Bunting and barricades to reduce risks to personnel on site (e.g. marking exclusion zones)
 - Signage to convey safety messages – placed visibly in the relevant work area, at eye height
 - **Machinery, tools and equipment may include:** Shovel, spade, stringlines, levels (line, spirit), square, tape measure, screwdrivers, caulk gun, drills, knife, wheelbarrow, cement mixer, excavator, compactor

Ensure they are appropriately selected, prepared and used for the task, following manufacturer recommendations



Plan and prepare work

- To prepare for water feature projects, you should familiarise yourself with the work area
 - Identify any WHS hazards and assess risks (e.g. unauthorised persons in work area, underground services, manual handling)
 - Consider the environmental impacts of the proposed works (e.g. noise, waste materials, degradation of land/flora/fauna)
- Report hazards to your supervisor within a timely fashion – especially emergency situations

Workplace risk assessment

- Risk is measured in terms of the seriousness of the possible **consequences** of the hazard and the **likelihood** that those consequences will occur, as in the matrix shown below:

Likelihood

1: Very Likely
2: Likely
3: Possible
4: Unlikely
5: Very Unlikely

Consequences

A: Death or Permanent Disability
B: Serious Injury
C: Lost Time Injury
D: Casualty Treatment
E: First Aid

Matrix	A	B	C	D	E
1	E	E	H	H	M
2	E	H	H	M	M
3	H	H	M	M	L
4	H	M	M	L	L
5	M	M	L	L	L

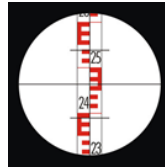
Set out and prepare site

- Follow the steps outlined below when setting up the site:
 - Locate services (e.g. telephone, gas, electricity, water, cable, sewerage)
 - Contact Dial Before You Dig to check the location of such services
 - Mark out the position of the water feature and depth of excavations
 - Locate existing elements/structures to take measurements from
 - Mark out the construction area
 - Use chalk on hard paved surfaces
 - Use stringlines and pegs over soil or turf
 - Marking Paint
 - A long garden hose may also be useful for marking out shapes on both hard and soft surfaces



Set out and prepare site

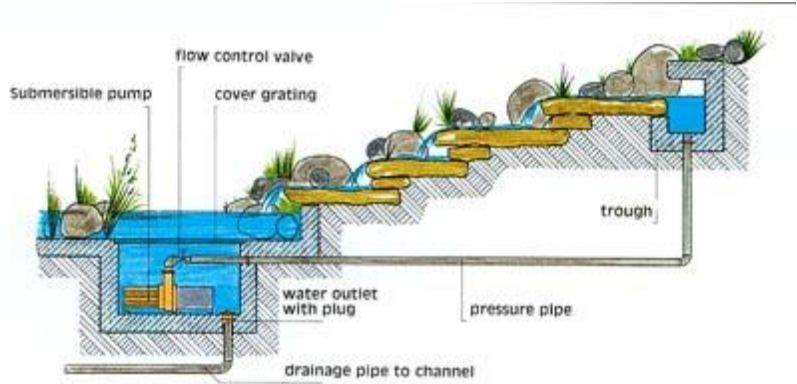
- Follow the steps outlined below when setting out the site:
 - Establish survey benchmarks
 - Benchmarks are based on established datum points
 - A datum is a level surface above or below which all heights are measured – think of it as a ‘starting point’



- The position of the job datum should be clearly marked on site plans
- Benchmarks are fixed points of known height to which other points can be referred
- Benchmarks should be established on positions or structures where they cannot be disturbed by construction activity

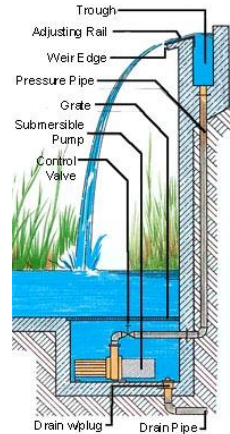
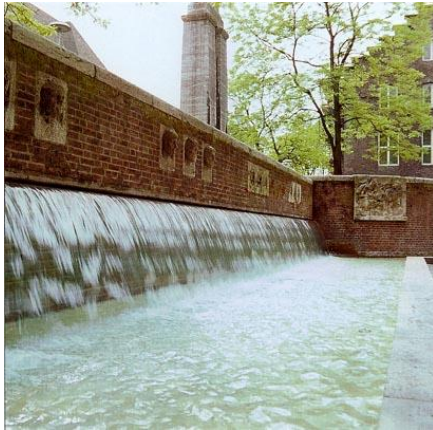
Set out and prepare site

- Depending on the type of water features, you may be required to install drainage – observe the plan requirements
 - Drainage can assist with cleaning the water feature, as well as rain overflow



Set out and prepare site

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 - Drainage can assist with cleaning the water feature, as well as rain overflow



- Note the effects of altering water flow when installing drainage
 - Be mindful of water pooling in new areas, which may affect nearby plants and structures
 - Ensure that slopes are directed away from buildings
 - Consider infiltration water – water entering the bedding sand must not pond
 - Consider subsurface flow – water from beyond the water feature and flowing under it
 - Consider surface runoff – that water falls directly onto the water feature and flows off the surface

Set out and prepare site

- As you undertake excavations, construct drainage and place bedding material, be sure to sort and stockpile soil and waste material ready for removal, reuse or recycling



- Depending on the type of water feature installed, you will have different requirements
- As a general outline, conduct the following:
 - Install the waterproof membrane, prefabricated shell or formed 'in situ' feature
 - Install all accessories to the feature as specified
 - Fill the feature with water

Install water feature and accessories

- Examples of water feature installation: Garden pond
- Step 1: Mark the pond's position and dig your hole
 - Consider the pond's position and check there are no power and gas lines underneath. Place pond carcass upside down on the area and spray around it to mark the position. Now dig a hole to the pond's depth, adding an extra 50mm.
- Step 2: Level and fill the pond
 - Place sand in the hole and level it off. This layer of sand will stop rocks perforating the pond carcass. Place the pond in the hole and check it is the right height. Check it is sitting so that water won't sit higher on one side. Backfill with soil around the pond. Fill it a quarter full with water. Check it is level again. Use pavers, pebbles or rocks to decorate around the sides.



Install water feature and accessories

- Examples of water feature installation: Garden pond
- Step 3: Install power point
 - Before you install your pond pump, make sure that you have access to an outdoor power point that has been installed by a qualified electrician. The power point needs to be close enough to the pond so that the electrical cable on the pump can reach it.
- Step 4: Attach the fittings
 - Before you put the pump in the pond, attach the feet to the bottom of it. These will secure the pump to the bottom of the pond and stop it from moving around. Screw the connector for the fountain kit into the top of the pond pump.



Install water feature and accessories

- Examples of water feature installation: Garden pond
- Step 5: Put the pump in the pond
 - Put the pump into your chosen location inside the pond, on a clean and stable surface. Make sure that the pump can be easily reached because you will need to take it out to regularly clean the filter. If the pump is sitting too deep in the pond you might need to sit it on a brick, so that it's at the right height.
- Step 6: Test the water-flow rate
 - After the pump has been put in the pond, at the right height, turn it on to test the water-flow rate. If it's too high, the flow rate can be adjusted on the pump. Alternatively, you can attach one of the nozzles from the fountain kit to get the desired flow rate and the look that you want. Depending on the height of the nozzle, you may not need to sit the pump on a brick.



- Examples of water feature installation: Garden pond
- Step 7: Cover the power cord
 - To make your finished project look professional, cover the electrical cable leading from the pump to the power point. If you have ornamental rocks around your pond, put them on top of the electrical cable to hide it. You can also dig a shallow trench in the soil, put the electrical cable in it and then cover that over with soil.



- Examples of water feature installation: Fountain
- Step 1: Select fountain stone
 - You may find a selection of predrilled stones or buy a stone and drill it yourself. Pour water over your stone selections to see how it flows.
- Step 2: Mark fountain location
 - Group some buckets and roughly assemble the stone fountain.
 - Use a rope to shape a natural-appearing perimeter for the basin and gravel bed. Keep in mind that a larger basin means more digging.
 - When you're satisfied, mark the edges with spray paint.



- Examples of water feature installation: Fountain
- Step 3: Dig out the fountain
 - Dig the reservoir end of the hole 20mm deeper than the pail height and the fountain end 20mm deep overall.
 - Roughly assemble your fountain and other decorative large stones and cluster the buckets to locate the deep end of the basin.
 - Dig the deeper part of the hole with steep sides and a flat bottom to leave plenty of room for the buckets.
 - Use the depth of the buckets as a guide to the proper depth.
 - Place bedding and compact bedding material to protect the items that are to sit on top from punctures and collapsing (e.g. waterproof liner)



Install water feature and accessories

- Examples of water feature installation: Fountain
- Step 4: Place waterproof liner in the hole
 - Unfold the liner and centre it over the hole.
 - Push it into recesses and pleat it wherever necessary to fit against the sides of the hole.
- Step 5: Prepare and place buckets in the hole
 - These buckets will collect the cascade of water for reticulation and also reduces the amount of gravel required to fill the reservoir
 - Drill four columns of 10mm holes around the middle and near the bottom and top of each bucket. Then snap on the lids and rest the buckets in the hole.
 - Cut off the rim from the bucket to be used for the pump and cut and fold down a 40mm wide x 50mm flap at the top for the water line and electrical cable
 - Use a spade bit or a twist bit to drill 10mm drain holes in all the buckets.



Install water feature and accessories

- Examples of water feature installation: Fountain
- Step 6: Spread gravel around the buckets
 - Backfill around the reservoir buckets with 25-50mm of gravel, resting the pump bucket on the gravel so its top becomes even with grade. Keep the gravel 50mm below grade.
 - Stop filling when the height of the pump bucket is about two inches below grade level. Use pea gravel to fill the final 50mm.
- Step 7: Attach the water line to the pump
 - Connect the water line to the pump and route it to the stone fountain location, avoiding areas where heavy stones will rest.



Install water feature and accessories

- Examples of water feature installation: Fountain
- Step 8: Spread pea gravel
 - Pour in and level the pea gravel until it's even with the edges. Then use a steel rake to even out the surface.
- Step 9: Arrange stones and test water path
 - Place and roughly adjust the fountain stones using a garden hose placed near the fountain hole to simulate the water's path. Then flip over the stone to access the underside of the hole.



- Examples of water feature installation: Fountain
- Step 10: Connect fountain fittings to water line
 - Cut the water line to length and attach the fountain fittings.
 - Coat the plastic elbow with silicone sealant and work the fittings into the hole on the underside of the fountain stone.
- Step 11: Lock stones in place with pond foam
 - Test the water flow by filling the basin and running the pump.
 - Shift the stones as necessary, then fill around the stones with pond foam to lock them into place.

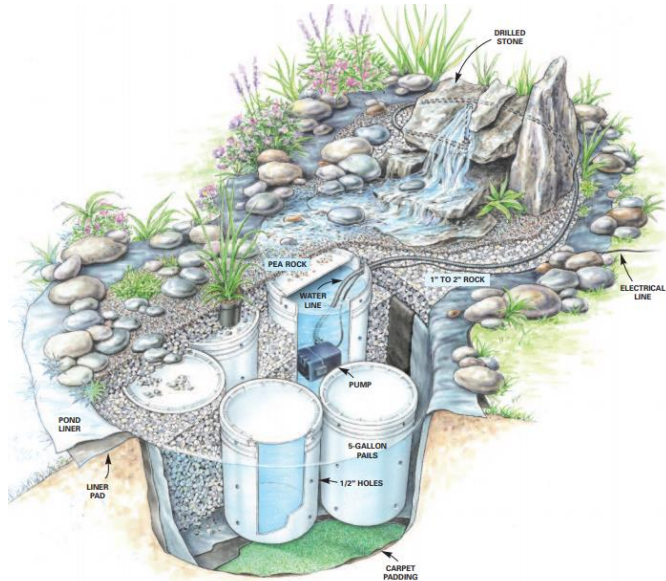


- Examples of water feature installation: Fountain
- Step 12: Decorate the fountain
 - Scoop out the pea gravel and set in potted pond plants, then finish the water feature with decorative topdressing and perimeter edging stones.
 - Trim off the overhanging liner even with the rim of the hole.



Install water feature and accessories

- Examples of water feature installation: Fountain



To reduce maintenance, this project eliminated the collection pond. Instead, a gravel-filled reservoir below collects the overflow for recirculation.

Install water feature and accessories

- It is important to ensure that your water feature is safe
 - Ensure the electricity is carefully insulated from water
 - Ensure that children are prevented from drowning
 - Check local council requirements for water risk management for children
 - Ensure that water is treated
 - Products can be used to treat the control of algae in water features
 - Be mindful of what products can be used in ponds with fish and aquatic plants
 - Products can be used to increase, decrease or stabilise the pH of water
 - Biological filters and bacteria may be applied to water
 - Chlorine and ammonia may need to be removed/reduced in water



- It is also important to check that the water feature is working efficiently
 - Test leaks and repair accordingly before putting in the final touches (e.g. decorative rocks)
 - Leaks in the seals or suction lines can cause water to seep, which may slow down water to a trickle
 - Switch off your water feature and fill it to the brim. If there is a leak, the water level will dip after some time
 - Observe whether the nearby ground becomes wet
 - Remove or neutralise contaminants resulting from excavation and installation work
 - Remove debris or leaves which can clog the pump
 - Check and clean the inlet valve and suction lines, if necessary

- Keeping your outdoor water feature clean is important to its longevity and overall appearance.
- Your maintenance schedule will vary depending largely on the size of your water feature but also on your particular environment.
- You should consistently monitor your water feature to be sure it always has sufficient water. A fountain without a proper water level means a pump that will run dry and malfunction.
- Most fountain specialists recommend that you change your pond or fountain water every 4-6 months.
 - This means removing all of the water from your water feature, cleaning all of the parts, and replacing fresh water in the fountain or pond.

- If your water fountain is small, it will be easiest just to disassemble it to remove all of the water.
 - Many features will come with a drain plug for this purpose.
- If your water feature is larger or does not have a drain plug, you can use the pump in your water feature to drain it.
 - Attach a long tube or length of hose to your pump's output and direct the tubing outside of your water feature. You can collect the water in a bucket or dump the water into your yard, whichever is most appropriate for your circumstance.
 - As long as the pump is below the surface of the water, you are not damaging the pump. Once the water level reaches the level of the pump, turn it off and use other tools, such as buckets and smaller containers, to remove the remaining water.

Install water feature and accessories

- Once all of the water has been removed, this is a good time to thoroughly clean the pump, basin, and any parts of your water feature.
 - To clean the pump thoroughly, wipe any debris or build-up from it with a cloth.
 - Open the cover and wipe down the inside of the pump as well.
 - Any hard-to-reach areas can be cleaned out with an old toothbrush.
 - Wipe down the basin or water-collection area with a clean cloth, using mild detergent if necessary to remove debris or build-up.
- Once all your water feature parts are clean, it's time to replace the pump and fill the feature with clean water from your garden hose.
 - Remember to leave the pump turned off until the water level is well above the level of the pump.

Quality check and clean up

- After constructing the water feature, you are required to complete the following practices:
 - Compare the quality of the finished works with the drawings and specifications standards
 - Record and/or report your work outcomes to your supervisor
 - Clean up the work area
 - Maintain, clean and store tools and equipment
 - Follow manufacturer's specifications and supervisor's instructions
 - Report faults that are discovered in logbook and/or site records

Activity 4: Have team members take photos and videos of your involvement with water features.
Be sure to include all stages of construction.

- After installing the water feature, you are required to complete the following practices:
 - **Dispose of materials that cannot be reused or recycled**
 - Separate soil, reusable and waste material (e.g. organic, inorganic and recyclable piles)
 - Ensure that you follow the enterprise guidelines (e.g. JSA and SWMS for handling and disposing of waste)
 - Follow Safety Data Sheets (SDS) and environmental plans to ensure environmentally safe practices

