



Model Number

Job Number

StormChamber® installation with liner for retention manual

www.spel.com.au

Before your StormChambers® arrive

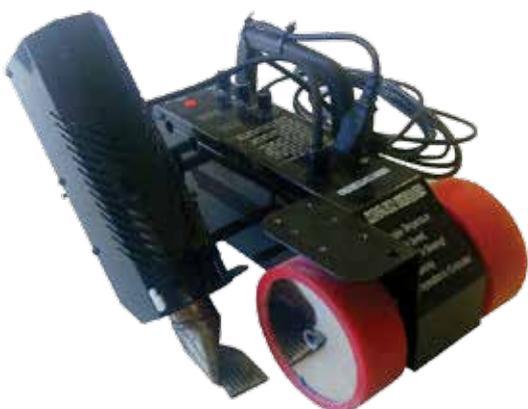
1. StormChambers® will arrive either on a flat bed trailer or in an enclosed van. If in an enclosed van, we will try our best to have the driver load the pallets at the tail of the van. However, be prepared with a long chain, metal cable, or strong rope or straps to drag a pallet from the nose of the van. A forklift is the easiest way to unload pallets of StormChambers®. Heavy lifting equipment is necessary for the handling of the poly liner.
2. A full pallet of StormChambers® will weigh approximately 1550kg, will be about 1525mm wide, 2590mm long, and approximately 2590mm high.

Materials Needed

1. Wire cutters to remove the metal bands that secure the StormChambers® to their pallets.
2. 75mm drywall screws to screw the overlaying bases of the StormChambers® together until the stone is placed around them.
3. 20mm-50mm crushed, washed, hard stone for the trench base and to backfill to minimum of 150mm above the StormChambers®. Do not use limestone.

Limestone gets pasty when wet and will tend to seal-off the bottom of the trench and reduce the void spaces in the stone.

4. 1200mm sections of 225mm (unless otherwise specified), DWV (Drainage) PVC or similar PVC pipe for the interconnections between rows of StormChambers® (check plans for number and location of interconnections).
5. 300mm bell and gasket DWV (Drainage) PVC, "Black Max" or similar PVC pipe for inspection/clean out risers (check plans for number and location of risers).
6. Cleanout caps or tops for inspection/clean out risers.
7. One manhole cover for each inspection/clean out riser in pavement (engineer to confirm load rating).
8. Manhole cover surround concrete ring or engineer to confirm manhole cover surround mounting details in pavement.



Equipment Needed

1. Forklift or other type of equipment to unload StormChambers® and liner.
2. Excavator to dig the trench and to place stone and soil backfill.
3. Two battery or power operated screw guns to connect bases of overlapping StormChambers®.
4. Sabre/reciprocating saw, router bit on drill or key hole saw.
5. Light weight, tracked dozer, not exceeding 5,370kg/m² to grade backfill.
6. Hand – operated compactor, small roller, or tracked vehicle for fill compaction. Tracked vehicle must not exceed 5,370kg/m²; hand operated compactor or vibratory roller must not exceed a dynamic force of 9000kg.
7. Transit or laser.
8. Stone bucket.
9. Welder for poly liner.

When your StormChambers® arrive

1. UNLOADING – see “Before Your StormChambers® Arrive ” above. As a last resort, the pallets can be dragged off of the trailer and dropped on the ground. This will not injure the StormChambers®.
2. Confirm the total number of StormChambers®, SedimenTraps™, light and heavy duty netting, filter fabric, rolls of liner, and any other items listed on your purchase order. Contact SPEL Environmental (+61 2 8838 1055 or sales@spel.com.au) immediately if the count is incorrect.
3. Confirm the number of Start, Middle and End StormChambers®. Each pallet should be marked with the number of each.
4. Check all StormChambers® and SedimenTraps™ for damage and contact SPEL Environmental immediately if any sign of damage is present.
5. During periods of excessive and/or extended hot weather please take one chamber at a time off of a pallet, just before placing it in the trench. Do not allow chambers to be left on their backs, exposing the underlying black color to the sun. If possible, keep pallets of chamber and backfill stone in the shade. Try to restrict chamber installation to the cooler morning periods. Place stone and soil backfill on chambers as they are being installed.

Trench preparation

1. Do not excavate trench until dry weather is forecast long enough to allow at least covering the StormChamber® system with filter fabric prior to raining to avoid soil filling void spaces in the stone.
2. Excavate to a width and length sufficient to accommodate the number of StormChambers® plus a minimum 300mm border around the entire StormChamber® system. The bottom of the bed must be level.
3. If the StormChamber® system was designed for infiltration. Refer to the StormChamber® installation guide.
4. Line base of excavation and trench walls with supplied poly liner. Ensure an overlap of minimum 300mm on liner joins to be welded. Use poly welder to create a watertight fusion joint/seal. Take every caution to ensure that the liner is not punctured or perforated during the installation process. If it does happen it must be made good. If your liner is supplied with a puncture or rip, stop work and please advise SPEL prior to installing.
5. Then overlay all poly liner with StormChamber filter fabric. Overlap adjacent filter fabric by at least 600mm. Do not place filter fabric under the StormChambers®.
6. Line trench walls with StormChamber® filter fabric. Overlap adjacent filter fabric by at least 600mm. Do not place filter fabric under the StormChambers®. The filter fabric will clog, restricting the infiltration capability of the StormChamber® system.
7. Impermeable Liner Installation (If Specified)
 - a. Line trench walls and base with the StormChamber Impermeable Liner. When using a wedge welder overlap the adjacent impermeable liner by 300mm. In installations when using double sided bonding tape overlap the adjacent impermeable liner by 450mm. Ensure the liner is installed in a way so there is sufficient liner to lay over the top of the trench once the StormChamber has been placed and the gravel has been installed.
 - b. Using a wedge welder or double sided bonding tape, seal all overlaps on the impermeable liner.
 - c. Where the inlet and (if specified) the Outlet pipe penetrates the Impermeable Liner use Welded Flanges (if supplied/specified) or a flexible sealant to waterproof the penetrations.
8. Unless otherwise specified, place 150mm of crushed, washed, 20mm-50mm noncalcareous stone on the bottom of the trench.
9. If it becomes impractical to level the stone base by hand, use a low pressure, tracked dozer, not exceeding 500kg/sf, maintaining at least 150mm of stone under the tracks at all times.
10. Do not use the excavated trench as a sedimentation trap or sediment basin during construction. The fine soil particles will accumulate at the soil boundary and restrict the infiltration capability of the system.



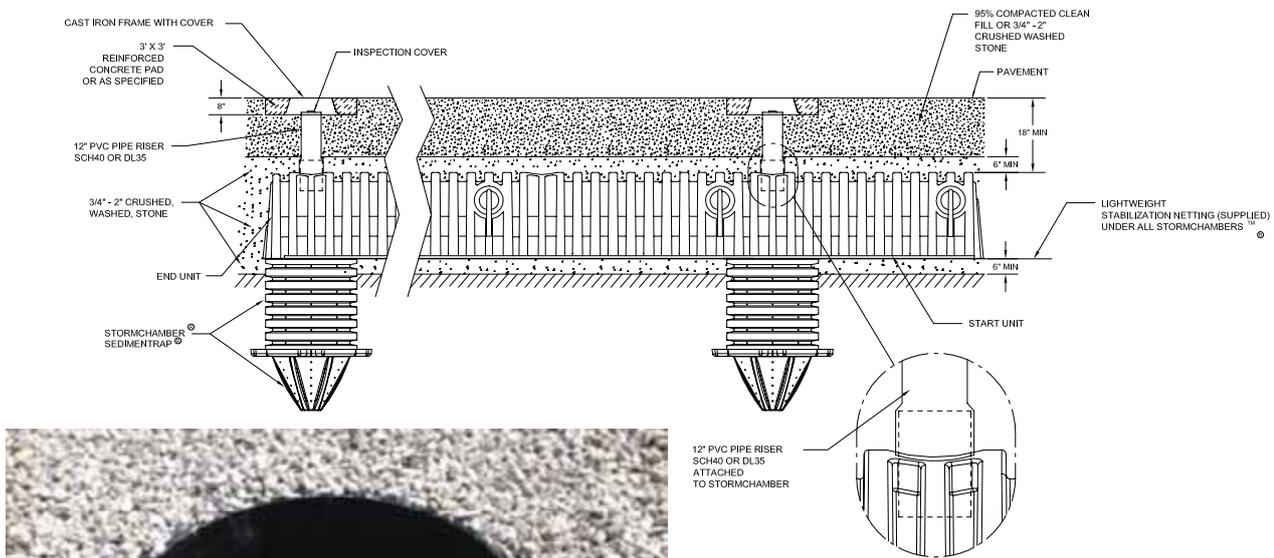
Line trench walls, not trench bottom, with StormChamber® filter fabric.

Installing the StormChambers® SedimenTrap™

Most StormChamber® systems are specified with our SedimenTraps™. The SedimenTraps™ are used as a low cost and highly effective method to capture and facilitate removal of sediment.

1. StormChamber® systems typically incorporate SedimenTraps™ at the first and last chamber of the row(s) receiving the storm water inflow. StormChamber® systems are installed by placing all start units first, then building each row equally with middle units and finish building the rows with the end units.
2. Working from the Start Unit end of the StormChamber® system, identify the location for the first SedimenTrap™. The SedimenTrap™ must be located so that the bottom is aligned exactly under the 300mm PVC riser pipe of the chamber over it.
3. Excavate a hole deep enough so that the SedimenTrap™, when placed on about 150mm of a crushed, washed 20mm-50mm non-calcareous stone base, only the top corrugation of the 750mm HDPE pipe section will be exposed above the finished trench stone base [about 75mm].

StormChamber® with SedimenTrap™



4. Fill around the SedimenTrap™ with the crushed, washed 20mm-50mm non-calcareous stone.
5. Cut the heavy weight stabilization netting to fit snugly under the exposed corrugation of the SedimenTrap™.
6. Place the start unit over the SedimenTrap™ and install the 300mm PVC riser pipe as shown in the above drawing. Cut a hole in the top portal for a 300mm DWV (Drainage) PVC, "Black Max" or similar riser pipe— along the indented circle. Attach about a 300mm piece of the pipe into the bell and insert the short piece into the top portal, allowing the bell end to rest on the StormChamber® portion that surrounds the top portal hole. If the cut extends more than 13 mm beyond the cut out, place a piece of the StormChamber® non woven filter fabric over the hole, cut an X slightly shorter than the width of the opening, and insert the pipe.



The purpose of the bell end is simply to support the pipe until the backfill is placed. Insert the bottom 300mm of pipe into the top portal and backfill. Place an access casting in a 900mm x 900mm reinforced concrete pad above, once all fill is placed, for risers in pavement.

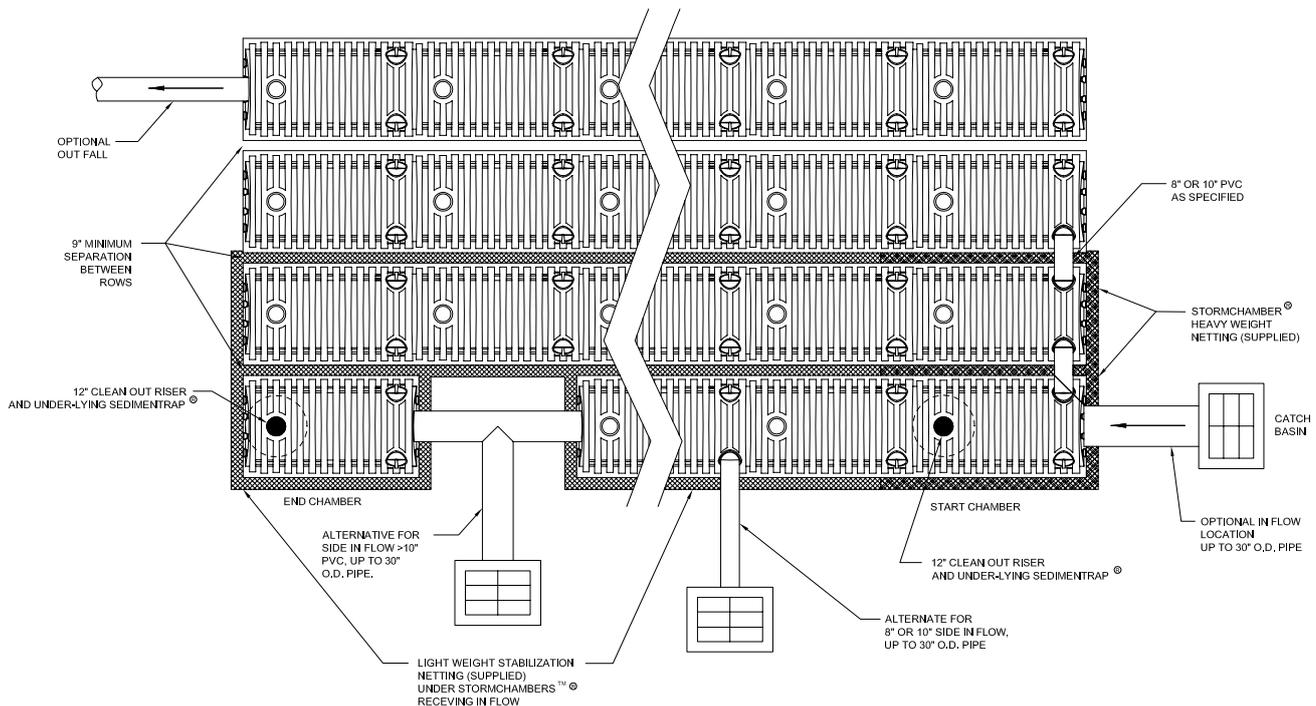
Placing the StormChambers®

1. Start building the StormChamber® system with the Start Model StormChambers® at the inflow end of the StormChamber® system. The Start Models are completely closed at the end with the two side portals.



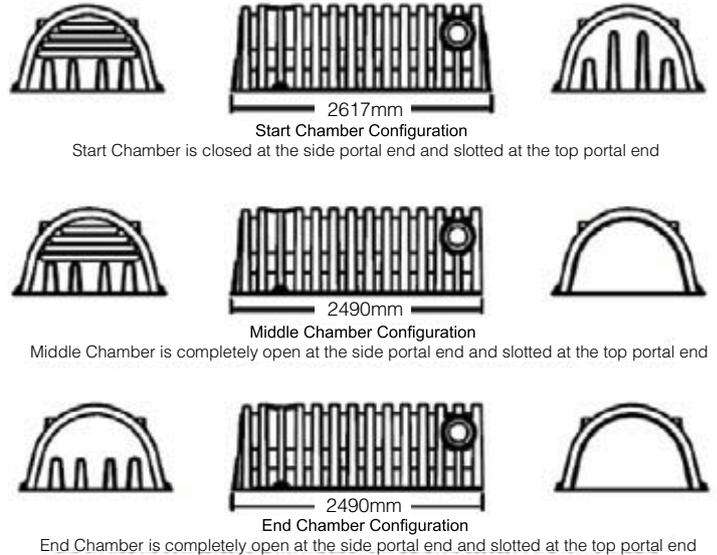
Row placement begins at inflow end of chamber system with Start Model StormChambers®.

2. Roll out a row of light weight stabilization netting underneath the entire row of StormChambers® that is receiving inlet storm drain pipes and the adjacent row(s).
3. Place one piece of the StormChamber® heavy weight stabilization netting (provided with the StormChambers®) under each StormChamber® that will be receiving inlet storm drain pipes. Place on top of the light weight netting and extend beyond all edges of the StormChamber® as shown above. The purpose of the heavy weight stabilization netting is to function as a “splash pan,” preventing excavation of the underlying stone and soil, while allowing infiltration to occur.



Place heavyweight stabilization netting under chambers receiving storm drain inflow, and light weight netting under row(s) receiving inflow and adjacent row(s).

- Place the Start Model StormChambers® (completely closed at the end with the two side portals), spaced a minimum of 1750mm apart at the center line of the end walls 230mm apart at the base]. Position the closed ends at least 300mm from the trench wall.



- Cut open the side portals for the inflow storm drain pipes (size and location specified on the plans) and lateral connecting pipes between StormChamber® rows [200mm or 250mm DWV (Drainage) PVC, "Black Max" or similar] with a reciprocating saw, router bit on a drill, or keyhole saw along the defined indented circle. If the inflow storm drain pipe is specified to enter the closed end wall, place a piece of the pipe against the end wall. Trace the diameter of the pipe on the end wall and cut out the circle.
- If a cut extends more than 13mm beyond the intended diameter, place a piece of the StormChamber® non-woven filter fabric over the hole, cut an "X" just short of the width of the opening, and insert the pipe. The connection does not need to be water tight. 250mm PVC pipe is the largest diameter pipe that can be inserted into the side portals. The end walls can accept up to a 750mm O.D. pipe.



Cut out side portals for PVC inflow pipe and row connecting pipes. Cut out indentation guides are provided for 200mm, 250mm PVC.



Insert PVC row connecting pipes.

- Mark the midpoints of 200mm or 250mm PVC pipe and insert into the adjacent StormChambers® where specified so that the marked midpoint is centered between the two adjacent StormChambers®. Pipe length should be sufficient to extend 150mm – 300mm into both adjacent StormChambers® [about 1200 mm]. In order to facilitate placement, install the lateral connecting pipes in the specified StormChambers® before attaching the next StormChamber® in the row.
- If the locations of row – connecting pipes are not specified, add PVC pipes only between the inflow row and adjacent row(s).

9. Roll out additional StormChamber® light weight stabilization netting, over-laying the previous sheet by 300mm and place the first rib of a Middle Model (completely open at side portal end, partially open at top portal end) over the last rib of each of the Start Model StormChambers®.
10. Screw the StormChambers® together near their base on both sides with regular 75mm dry wall screws. One screw on each side is sufficient to temporarily hold the StormChambers® together until the stone is placed. The gap between the two StormChambers® near their base must be closed enough to prevent stone from migrating into them to prevent potential surface subsidence.



Place first rib of a middle unit, over last rib of each start unit.



Screw StormChambers® together at base to prevent stone inflow.

11. Continue placing and screwing the rest of the StormChambers®, one at a time, inserting any additional lateral – connecting pipes as specified.



After placing all start units, build each row equally with middle units and finish building the rows with end units.

12. Leaving at least 300mm between the end of the End Model (completely open at the side portal end, completely closed at the top portal end) and the trench wall.



End each row with an End Unit StormChamber® which is closed at the top portal end and open at the side portal end.

13. If inspection/clean out risers are specified without a SedimenTrap™, follow the instructions in #6 on page 5.



Place heavyweight stabilization netting under chambers with cleanout risers when SedimenTraps™ are not used.

14. Deposit 20mm-50mm crushed, washed, hard stone directly along the centerline of the StormChambers® to evenly flow down each side to keep the StormChambers® in proper alignment. DO NOT use limestone. Limestone gets pasty when wet and will tend to reduce the void spaces in the stone.



Deposit 20mm-50mm crushed, washed, hard stone directly along the centerline of the StormChambers®

15. Level the stone cover with a vibratory compactor, not to exceed a dynamic force of 4500kg, or with a low pressure, tracked vehicle not exceeding 5,370kg/m².

IMPORTANT: If a low pressure, tracked dozer is used, do not run the dozer on anything less than 150mm of stone above the StormChambers®.

Spread stone in small piles to prevent movement of the StormChambers®. Caution must be exercised when placing stone on top of the StormChambers® so that excessive pressure is not applied directly on the StormChambers® by equipment “buckets”.

16. Cover the stone with StormChamber® filter fabric. Overlap adjacent sheets by at least 600mm.

Backfilling

1. Backfill soil must be free from large stones and large organic material (e.g. tree limbs and root stumps), and must be capable of being compacted to at least 95% of the Standard Proctor Test (AASHTO Method T – 99). If not, crusher run or other suitable backfill material must be used. The same type of stone surrounding the StormChambers® can also be extended up to the pavement sub grade, if desired.
2. Compaction of the soil backfill must be done in lifts 6” – 8” (150 mm-200 mm) high. Grading of lifts should start in one corner of the system with a low pressure tracked dozer, with a pressure not exceeding 5,370kg/m², keeping at least 300mm of fill in front of the blade at all times.

Compact lifts to at least 95% Standard Proctor with tracked vehicles not exceeding 5,370 kg/m², or with a hand operated compactor or vibratory roller not exceeding a dynamic force of 9000kg.
3. Restrict wheeled vehicles to a maximum axle load of 3600kg with 150mm of fill over the StormChambers® and 7200kg with 300mm of fill.
4. Keep the StormChamber® system closed or protected from receiving sediment until the site is completely stabilized.

IMPORTANT: After compaction of backfill and setting of final grade, avoid parking on or traversing over the StormChamber® installation with heavily loaded trucks and heavy equipment until paved.

IMPORTANT: These instructions assume accepted construction procedures and loaded trucks that do not exceed specified DOT load limits. Uncustomary loads or improper load distributions in vehicles may require additional cover. Contact SPEL Environmental for installation under abnormal conditions. Installations not in compliance with these instructions will void the warranty.

Contact SPEL Environmental for technical assistance at +61 2 8838 1055 or email us at sales@spel.com.au

StormChamber® Limited Warranty

SPEL Environmental will warranty the structural integrity of each system in accordance with the installation instructions and is warranted to the original purchaser against defective materials and workmanship for one year from the date of purchase. It is the responsibility of the purchaser to inspect the StormChamber® units prior to installation and to inform SPEL Environmental of any defect prior to installation. SPEL Environmental will only be responsible for supplying replacement StormChamber® unit(s). SPEL Environmental liability specifically excludes the cost of removal and/or installation of the units.

There are no other warranties with respect to the units, including no warranties of merchantability or fitness for a particular purpose. This warranty does not extend to incidental, consequential, special, or indirect damages. The company shall not be liable for penalties or liquidated damages, including loss of production and profits, labor and materials, overhead costs, or other loss or expense incurred by buyer. Specifically excluded from warranty coverage is damage to the units due to ordinary wear

and tear, alteration, accident, misuse, abuse or neglect of the units, improper construction protocols, installation of the units not consistent with StormChamber® installation instructions, placement by buyer of improper materials into buyer's system, or any other event not caused by the company. SPEL Environmental shall not be responsible for any loss or damage to the buyer, the units, or any third party resulting from its installation or shipment. Buyer shall be solely responsible for ensuring that installation of the system is completed in accordance with StormChamber® installation instructions and with all applicable laws, codes, rules and regulations.

Inspect all shipments within 5 days of receipt of StormChambers®. Failure to advise SPEL Environmental of defects on shipments within this period will constitute acceptance of the shipment.

This warranty shall not apply to any party other than the original buyer. Furthermore, no company representative has the authority to modify or change this warranty in any manner.



The StormChamber® is protected by the following U.S. Patents: 6,612,777; 469,187; 465,545; D469,187; D465,545; 6,719,490; 6,994,490. Canadian Patents: 2,356,592; 2,491,126. Other U.S. foreign and Canadian Patents Pending.



HEAD OFFICE

PO Box 6144
Silverwater NSW 1811

100 Silverwater Rd
Silverwater NSW 2128

Phone: +61 2 8705 0255

Fax: +61 2 8014 8699



DESIGN OFFICES

New South Wales 61 2 8705 0255

Canberra 61 2 6128 1000

Queensland 61 7 3271 6960

Victoria & Tasmania 61 3 5274 1336

South Australia 61 8 8275 8000

West Australia 61 8 9350 1000

Northern Territory 61 2 8705 0255

New Zealand 64 9 276 9045



www.spel.com.au

SPEL Environmental accepts no responsibility for any loss or damage resulting from any person acting on this information. The details and dimensions contained in this document may change, please check with SPEL Environmental for confirmation of current specifications.