

PLURA
INNOVATIONS

GENUS

SubTerra™

General Installation Guide

CTING001

Version 1.0 September 2020

Contents

Introduction	03
Install Classification Guidance	03
Equipment and Materials	04
Materials	04
Equipment	04
Chamber Install Process	05
Excavation	05
Base	05
Duct Entries	06
Wall Accessories	07
Backfilling	07
Final Adjustments	08
Covers and Frames	08
Reinstatement	08
Chamber Drawings	09
Table A8.1	10
Table B	11

This document is a general installation guide for the GENUS SubTerra™, if you require any more information, please contact us at info@plurainnovations.com

Introduction

The correct installation of the GENUS SubTerra™ Access Chamber Systems is detailed in this guide. The guide is a general outline of the installation, this may vary slightly each time due to site conditions and project specifications. PLURA reserves the right to review and update this document as required.

Please contact PLURA to discuss and agree any changes that may be required to the recommended installation on site.

Install Classification Guidance

This installation guide is for the GENUS SubTerra™ Access Chambers for installation in areas classed as Groups 1, 2, 3 or 4 in accordance with European Standard EN 124 :1994

Group 1: A15 Classification

Areas which can only be used by pedestrians and pedal cyclists.

Group 2: B125 Classification

Footways, pedestrian areas and comparable areas, car parks or parking decks.

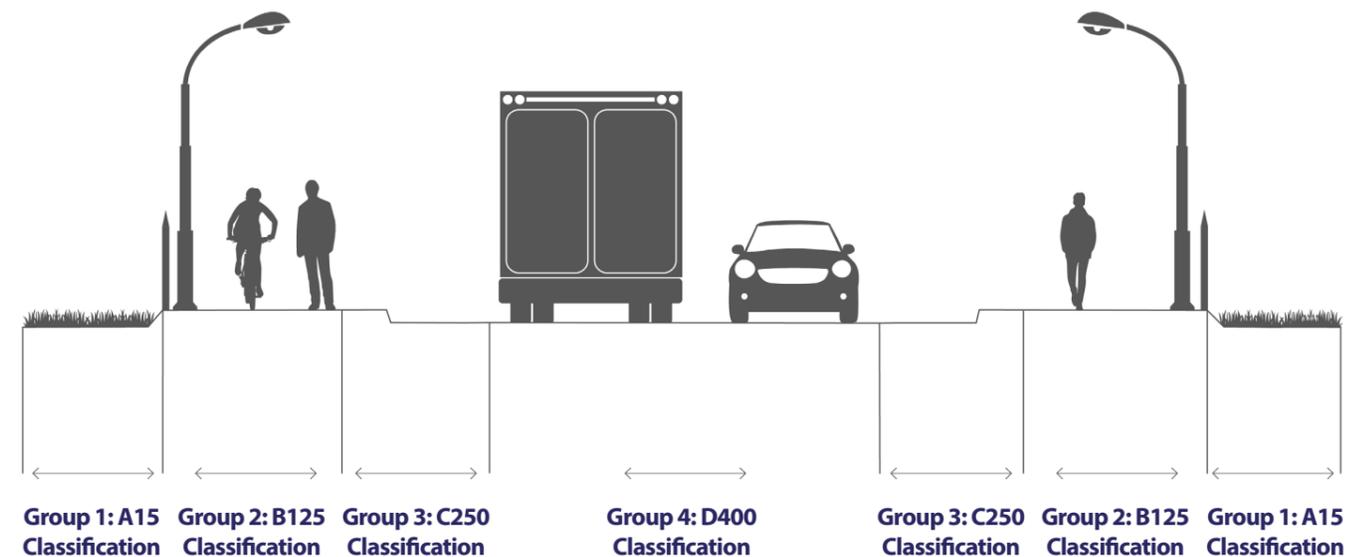
Group 3: C250 Classification

Areas which when measured from the kerb edge extend a maximum of 0.5m into the carriageway and a maximum of 0.2m into the footway.

Group 4: D400 Classification

Roadways, carriageways and areas used by fast moving vehicular traffic.

This means that GENUS Subterra™ chambers can be situated in either the footway or the road, depending on how they are installed and the specification that they follow. Both of these situations are addressed and covered within this document.



Equipment and Materials

To effectively install the GENUS SubTerra™, you will need additional equipment and materials as listed below.

Materials

- Base materials as shown in Table B.
- Bedding materials such as mortar cement or epoxy resin bedding mortar.
- Backfill materials as shown in Table B.

Equipment

- Equipment for excavating a hole; pneumatic hammer, digger etc. Depending on the condition of the ground and location the chamber is being installed into.
- Spade or shovel
- Means of compacting the material surrounding the chamber and the base.

Please refer to the "Specification of the Reinstatement of Openings in Highways - Table A8 - Page 10

- Handsaw
- Measuring tape
- Floats and Trowels for working and finishing cement and concrete.
- Drill bits if required to move any furniture positions.
- Spirit level and straight edge.
- Power drill and hole saw for duct diameter if in use.

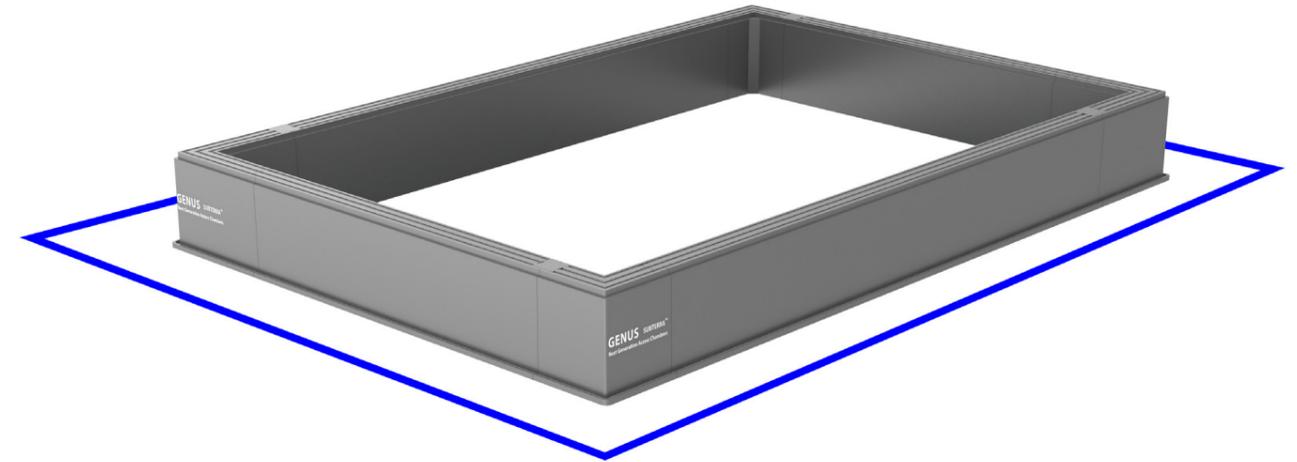
Health and Safety

- Contractor should have Method Statement and Risk Assessment for the works being carried out.
- Appropriate PPE should be worn on site relative to the task being carried out.
- Hi Visibility Clothing as necessary.
- Hand and eye protection should be work for manual handling and any drilling / hole cutting on site.
- Any interface with public access should be signed and guarded in accordance with the Safety at Street Works and Road Works code of practice (NRSWA 1991) or equivalent standard.
- Extreme care should be taken at all times when excavating, procedures should be put in place to protect all existing services.

Chamber Install Process

Mark Area of Excavation

- Place the chamber on the location you wish it to be installed and mark the ground around it, allowing for backfill minimum thickness as discussed later in table B, or the width of the compaction plant, whichever is larger.



Excavation

- Excavate to the required depth, remember to allow for the depth of the base required and the depth of the cover & frame with bedding mortar as well as the overall chamber depth.

Base

Mark a line around chamber for excavation footprint.

- Make sure the bottom of the excavation is firm by using suitable compaction equipment. Any soft spots should be removed. Some chamber installs will require a concrete base and some will only require a compacted Type 1 granular base, this is normally dependent on the location and loading expected on the chamber. Ensure the base is firm and level for the chamber to be installed. Piece of PVC pipe to be set in the concrete base for the sump.
- It is important to spend the time to get the base right as mistakes at this stage with the depth / level will only lead to problems later in the process..
- Once the base is done you can now start to install the chamber sections. They are 150mm deep and stack on top of each other. You need to gently tap the section down onto the one below to ensure it locks together properly.
- Always ensure the vertical joints are staggered like brick-work on each separate ring that is installed. The chambers sent out by PLURA will have different size corner pieces to allow for alternate rings to be installed and this will ensure the entire chamber has staggered vertical joints. Build the chamber up to the required height by using the appropriate number of rings and always allow for the final cover & frame and bedding mortar.

N-Force

- Some of our larger size chambers will be supplied pre-fitted with a GRP sidewall beam called N-Force. This will be sandwiched between two standard rings and only adds approx 15mm to the height of the chamber for each N-Force ring required. It is best to avoid drilling duct entry holes through this beam where possible.

Chamber Install Process

Duct Entries

- We recommend using a good quality drill and bi-metal hole saw to make appropriate size duct entry holes in the chamber. Always check the outside diameter of your duct and drill the hole slightly bigger. Bellmouths can be supplied if required.
- Leave a minimum of 30mm gap between duct entries and 50mm away from internal corner of chamber.

DUCT ENTRIES AND CHAMBER ASSEMBLY



Chamber Install Process

Wall Accessories

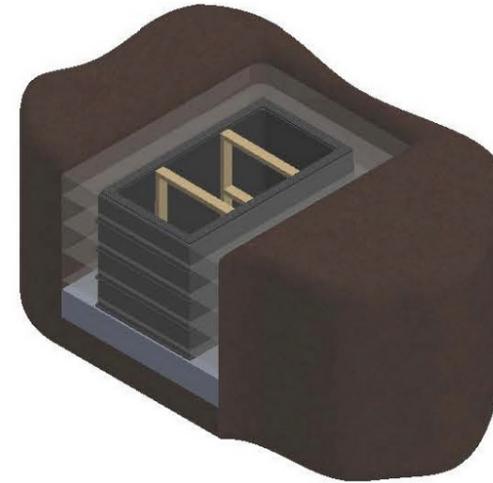
- Install any Cable Management Brackets / Bearers and Step Irons at this stage and prior to backfilling. Drill holes in the chamber wall where required and bolt through the cable management / step accessories as necessary.

Backfilling

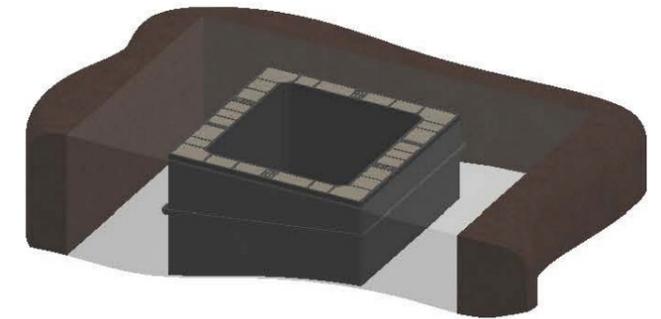
When the chamber is fully installed to its required depth, wall accessories fitted and duct entries formed, the backfill surround of the chamber can go ahead. Care should be taken when backfilling and compacting around the chamber. See Table B for correct backfill materials to be used. Some larger sized chambers will need internal bracing to protect the long sidewall during the backfill process. Backfill material should be placed carefully and evenly around all four sides of the chamber and in layer thicknesses relative to the compaction equipment being used. See Table A8.1.

Please refer to the "Specification of the Reinstatement of Openings in Highways - Appendix A8" for the number of passes and layers required for each material and compaction method used.

BACKFILLING AND FINISHING TOUCHES



Example of bracing in a FW10 chamber.



Example of a 600 x 600 chamber



Example of bracing in a very large bespoke PLURA chamber

Chamber Install Process

Final Adjustments

The top ring of the chamber can be cut horizontally if necessary to fine tune the finished level to tie in with ground level. It is always best to install the chamber to the correct level to begin with to prevent having to cut the chamber horizontally.

Mark your cut lines on the top ring section for the horizontal cut. You can create a crossfall on the chamber by marking, for example, 30mm down on one side and 75mm down on the other side, mark a line between both measurements and you will cut a taper off the top of the chamber ring to suit the finished level required.

Top ring that has been cut on site can be installed as normal and the voids inside the chamber ring that have been exposed by the cut should be filled with lean mix concrete, grout or mortar. The cover and frame can then be bedded on top as normal.

Covers and Frames

The Frame and Cover can be installed once the chamber is backfilled fully.

Remove the Cover and set aside safely. Use the Frame to check the finished levels. Position the Frame on top of the chamber and check the level with the finished ground level, the top of the Frame should be approx 10mm - 30mm below the finished ground level, this is to allow for bedding mortar between the top of the chamber and the underside of the frame.

Once all levels are checked, remove the Frame and place the approved bedding mortar material all around the top ring of the chamber to the required thickness. If necessary, use a screwdriver or similar to prise down the external grout lugs around the corners of the frame to a horizontal position for setting into the mortar bedding and haunching of the frame.

Position the frame carefully on to the mortar bed, making sure the inside faces of the frame are in line with the edges of the chamber. This should happen automatically if using a rising frame.

To level the frame, gently tap the frame into the mortar bed until the desired level is achieved, checking the frame is still in a coplanar state.

Remove excess mortar that has entered the chamber, and trowel mortar over exterior grout lugs/flanges at a 45° angle away from the frame.

Once the bedding mortar has cured sufficiently, the covers can be placed inside the frame. For carriageway locations and / or where quicker installations are required, an epoxy resin mortar or similar could be used.

Reinstatement

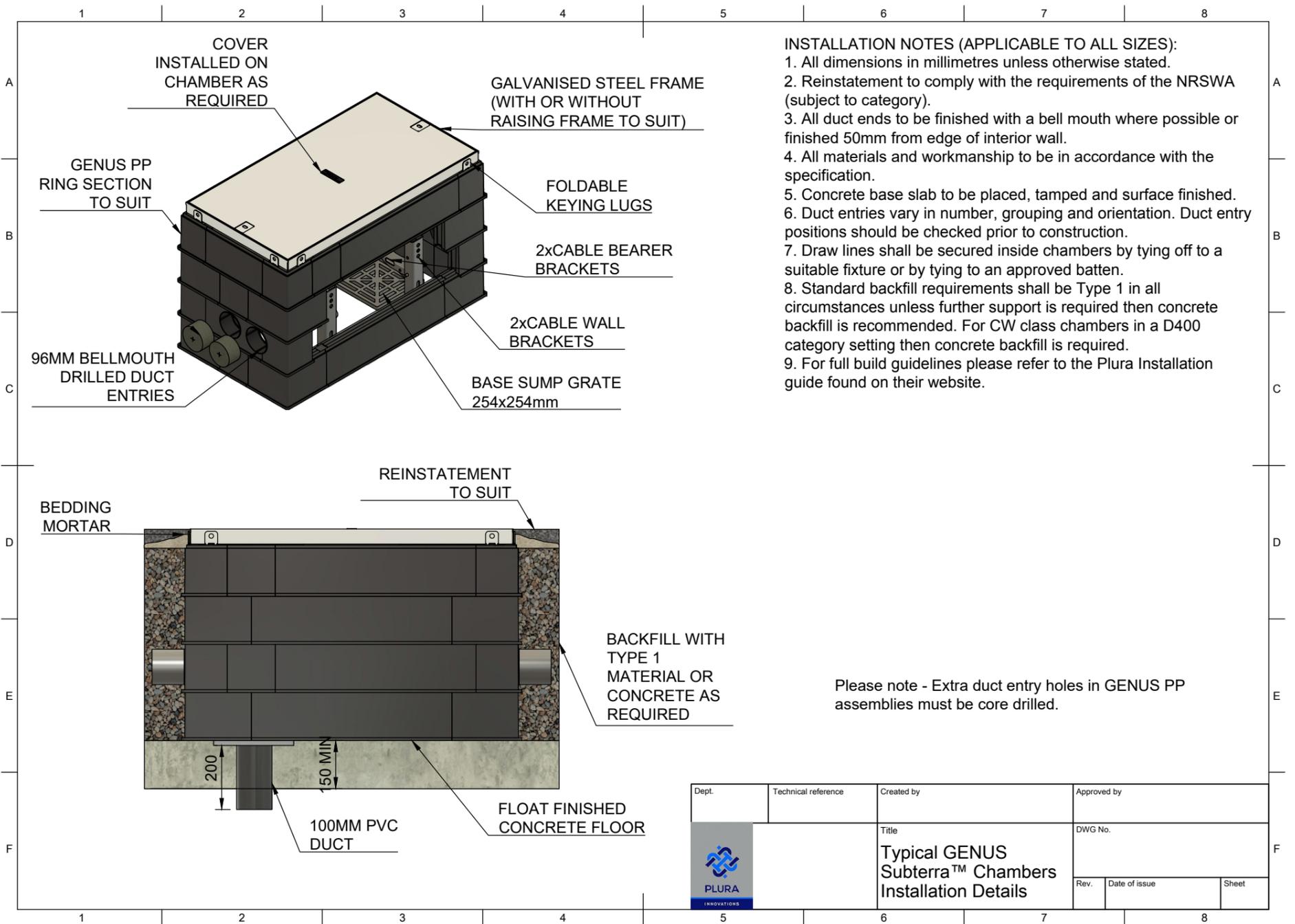
- Reinstatement the finished surface around the chamber and cover.



INSTALLATION NOTES (APPLICABLE TO ALL SIZES):

1. All dimensions in millimetres unless otherwise stated.
2. Reinstatement to comply with the requirements of the NRSWA (subject to category).
3. All duct ends to be finished with a bell mouth where possible or finished 50mm from edge of interior wall.
4. All materials and workmanship to be in accordance with the specification.
5. Concrete base slab to be placed, tamped and surface finished.
6. Duct entries vary in number, grouping and orientation. Duct entry positions should be checked prior to construction.
7. Draw lines shall be secured inside chambers by tying off to a suitable fixture or by tying to an approved batten.
8. Standard backfill requirements shall be Type 1 in all circumstances unless further support is required then concrete backfill is recommended. For CW class chambers in a D400 category setting then concrete backfill is required.
9. For full build guidelines please refer to the Plura Installation guide found on their website.

Please note - Extra duct entry holes in GENUS PP assemblies must be core drilled.



Dept.	Technical reference	Created by	Approved by
		Title	DWG No.
		Typical GENUS Subterra™ Chambers Installation Details	
		Rev.	Date of issue
			Sheet

Table A8.1 Compaction requirements for granular, cohesive and cement bound materials						
Compaction plant and weight category	Cohesive material (less than 20% granular content)			Granular material (20% or more granular content including cement bound material)		
	Minimum passes/lift for compacted lift thickness up to					
Vibrotamper	100mm	250mm	200mm	100mm	150mm	200mm
	4	8#	NP	4	8	NP
Vibrating Roller Single Drum	600 - 1000 kg/m	NP	NP	NP	NP	NP
	1000 - 2000 kg/m	8	NP	NP	NP	NP
Twin Drum	2000 - 3500 kg/m	3	6	NP	5	7
	Over 3500 kg/m	3	4	6#	4	6
Vibrating Plate	600 - 1000 kg/m	NP	NP	NP	NP	NP
	1000 - 2000 kg/m	4	8	NP	6	NP
All Above Plant	Over 2000 kg/m	2	3	5#	3	4
	1400 - 1800 kg/m ² Over 1800 kg/m ²	NP	NP	NP	5	NP
For maximum and minimum compacted lift thickness see Table A2.5						
Compaction of small excavations and narrow trenches must comply with S6.5						
Vibrotamper 25kg minimum	Minimum of 6 compaction passes					
Percussive Rammer 10kg minimum	Maximum of 10mm compacted lift thickness					

Table B					
EN124 Group	Recommended Minimum Cover Class*	Maximum Chamber Depth (mm)	Excavation Footprint	Base Material	Backfill
1	A15	2400	150mm or width of compacting equipment	50mm of compacted stone (MOT1)	Sidewall length < 1500mm as dug if granular is OK, otherwise compacted MOT1 stone. Sidewall length between 1500 and 3000mm compacted MOT1 stone. Sidewall length > 3000mm minimum 100mm C30 concrete.
2	B125	2400	150mm or width of compacting equipment	150mm of lean mix concrete (C30)	Sidewall length < 1200mm as dug if granular is OK, otherwise compacted MOT1 stone. Sidewall length < 2500mm compacted MOT1 stone. Sidewall length > 2500mm minimum 150mm C30 concrete.
3	C250	2400	150mm or width of compacting equipment	150mm of lean mix concrete (C30)	Sidewall length < 1000mm as dug if granular is OK, otherwise compacted MOT1 stone. Sidewall length < 2500mm compacted MOT1 stone. Sidewall length > 2500mm minimum 150mm C30 concrete.
4	D400	2400	200mm or width of compacting equipment	200mm of lean mix concrete (C30) reinforced with A393 mesh.	Sidewall length < 800mm as dug if granular is OK, otherwise compacted MOT1 stone. Sidewall length < 1800mm compacted MOT1 stone. Sidewall length > 1800mm minimum 200mm C30 concrete.
5	E600	2400	200mm or width of compacting equipment	250mm of lean mix concrete (C30) reinforced with A393 mesh.	Sidewall length < 600mm as dug if granular is OK, otherwise compacted MOT1 stone. Sidewall length < 1500mm compacted MOT1 stone. Sidewall length > 1500mm minimum 200mm C40 concrete.

If installing chambers beyond the depths specified, please contact PLURA for further information.
 * Cover class refers to the recommended minimum chamber and frame for the EN124 group.
 Backfill requirements are as per EN124 Group, see diagram 1 for reference.

The backfill conditions are related to where the chamber is installed (EN124 Group)



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