

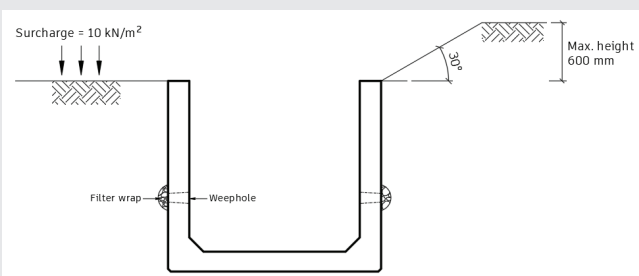
# Precast RC **U-DRAIN**

## FEATURES

- LTH Precast RC U-Drains are available in both standard sizes (nominal width 600mm to 1800mm) and super sizes (nominal width 2100mm to 3600mm).
- Standard length is 1 meter.
- LTH Precast RC U-Drains are available in both with and without Dry Weather Flow (DWF) channels.
- Weepholes are provided to release hydrostatic pressure from earth backfill behind wall.

## DESIGN CONSIDERATIONS

- LTH Precast RC U-Drains are designed to the requirement of BS 8110: 1997
- Concrete cover is 30 mm.
- Characteristic strength of concrete,  $f_{cu}$  is to be 40 N/mm<sup>2</sup> at 28 days and characteristic strength of steel reinforcement,  $f_y$  is to be 460 - 500 N/mm<sup>2</sup>.
- Bulk density of soil is to be 19 kN/m<sup>3</sup> with internal friction angle,  $\Phi$  is 30° and active pressure coefficient factor,  $k_a$  is to be 0.333.
- Maximum live load (surcharge) is to be 10 kN/m<sup>2</sup> or equivalent to earth filling less than 600 mm height.
- LTH Precast RC U-Drains are designed for the standard load condition as shown below: -



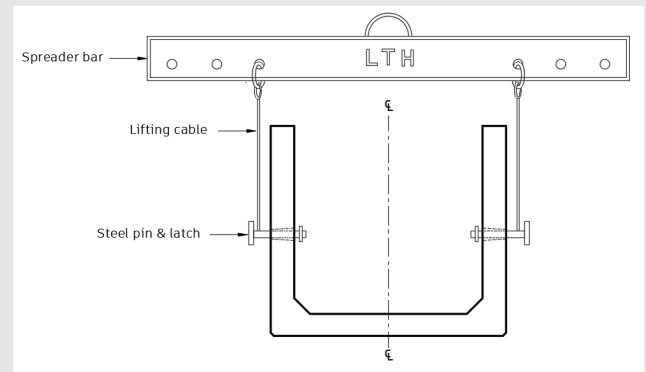
- For other loading conditions or U-Drain sizes, please contact Engineering Department for special design.

### Joining:

- LTH Precast RC U-Drain used plain butt joint and if necessary, cement-sand mortar use to fill the gap between U-Drain unit.

### Handling:

- A spreader beam with lifting cable and steel pin should be used when lifting LTH Precast RC U-Drain unit. This lifting method will avoid crack occurs at joint between wall and base.

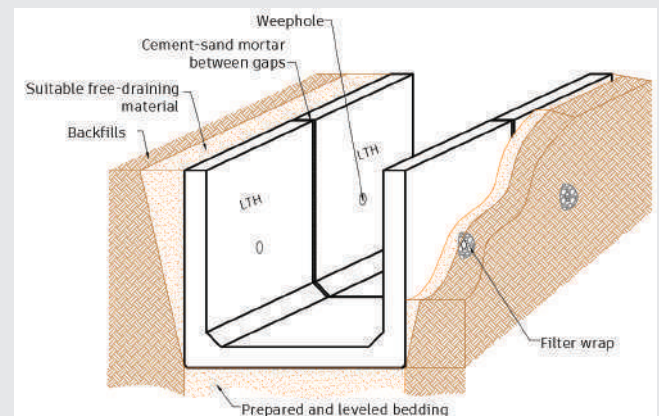


### Laying:

- LTH Precast RC U-Drains should be laid on prepared and leveling bedding (e.g sand bedding) to ensure load distribute uniformly under U-Drain base.

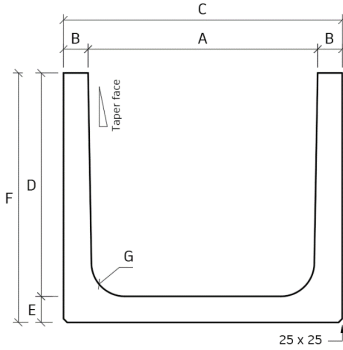
### Backfilling:

- Earth backfills with selected free draining material. Filter wrap at weepholes are recommended to be used as function to release hydrostatic pressure.



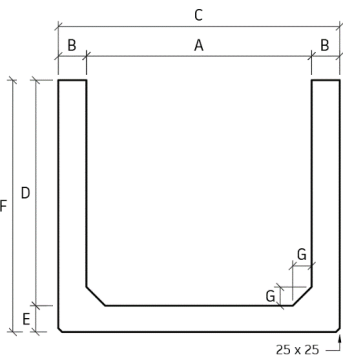
Recommendation of laying, jointing and backfilling of LTH Precast RC U-Drain (cross-section view)

# Standard Small Size LTH Precast RC U-Drain without DWF



LTH Precast RC U-Drain without DWF (Type 1)

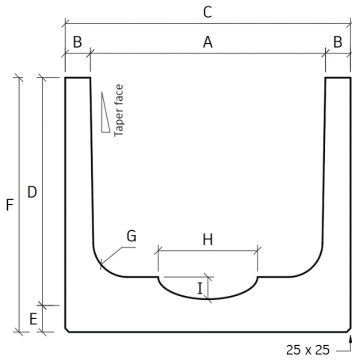
Nominal size (A x D) mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	Weight tonne
600 x 225	586	82	750	225	70	295	45	0.215
600 x 300	590	80	750	300	70	370	45	0.244
600 x 450	594	78	750	450	70	520	45	0.302
600 x 600	600	75	750	600	70	670	45	0.356
900 x 300	860	90	1040	300	85	385	60	0.344
900 x 450	870	85	1040	450	85	535	60	0.407
900 x 600	880	80	1040	600	85	685	60	0.466
900 x 750	890	75	1040	750	85	835	60	0.522
900 x 900	900	70	1040	900	85	985	60	0.574



LTH Precast RC U-Drain without DWF (Type 2)

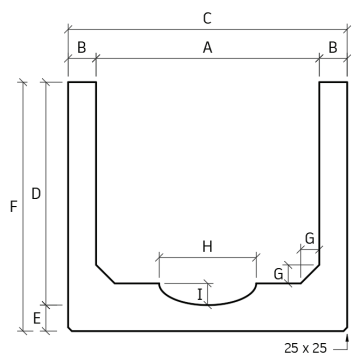
Nominal size (A x D) mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	Weight tonne
450 x 450	450	60	570	450	60	510	40	0.216
750 x 300	750	80	910	300	85	385	48	0.305
750 x 450	750	80	910	450	85	535	48	0.362
750 x 600	750	80	910	600	85	685	48	0.420
750 x 750	750	80	910	750	85	835	48	0.478
1200 x 300	1200	90	1380	300	90	390	75	0.440
1200 x 450	1200	90	1380	450	90	540	75	0.504
1200 x 600	1200	90	1380	600	90	690	75	0.569
1200 x 750	1200	90	1380	750	90	840	75	0.634
1200 x 900	1200	90	1380	900	90	990	75	0.699
1200 x 1050	1200	90	1380	1050	90	1140	75	0.764
1200 x 1200	1200	90	1380	1200	90	1290	75	0.828
1500 x 600	1500	125	1750	600	135	735	150	0.980
1500 x 750	1500	125	1750	750	135	885	150	1.070
1500 x 900	1500	125	1750	900	135	1035	150	1.160
1500 x 1050	1500	125	1750	1050	135	1185	150	1.250
1500 x 1200	1500	125	1750	1200	135	1335	150	1.340
1500 x 1350	1500	125	1750	1350	135	1485	150	1.430
1500 x 1500	1500	125	1750	1500	135	1635	150	1.520
1800 x 750	1800	125	2050	750	135	885	150	1.167
1800 x 900	1800	125	2050	900	135	1035	150	1.257
1800 x 1050	1800	125	2050	1050	135	1185	150	1.347
1800 x 1200	1800	125	2050	1200	135	1335	150	1.437
1800 x 1350	1800	125	2050	1350	135	1485	150	1.527
1800 x 1500	1800	125	2050	1500	135	1635	150	1.617
1800 x 1650	1800	125	2050	1650	135	1785	150	1.707
1800 x 1800	1800	125	2050	1800	135	1935	150	1.797

# Standard Small Size LTH Precast RC U-Drain with DWF



LTH Precast RC Box Culvert with DWF (Type 1)

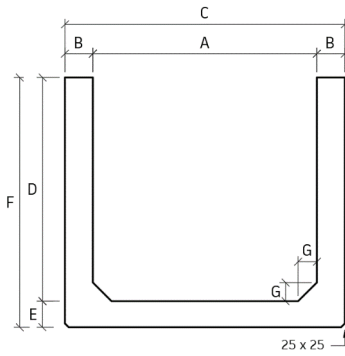
Nominal size (A x D) mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	Weight tonne
600 x 225	586	82	750	225	70	295	45	300	75	0.278
600 x 300	590	80	750	300	70	370	45	300	75	0.307
600 x 450	594	78	750	450	70	520	45	300	75	0.365
600 x 600	600	75	750	600	70	670	45	300	75	0.420
900 x 300	860	90	1040	300	85	385	60	600	75	0.414
900 x 450	870	85	1040	450	85	535	60	600	75	0.477
900 x 600	880	80	1040	600	85	685	60	600	75	0.536
900 x 750	890	75	1040	750	85	835	60	600	75	0.592
900 x 900	900	70	1040	900	85	985	60	600	75	0.644



LTH Precast RC U-Drain with DWF (Type 2)

Nominal size (A x D) mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	Weight tonne
450 x 450	450	60	570	450	60	510	40	300	75	0.254
750 x 300	750	80	910	300	85	385	48	450	75	0.376
750 x 450	750	80	910	450	85	535	48	450	75	0.434
750 x 600	750	80	910	600	85	685	48	450	75	0.491
750 x 750	750	80	910	750	85	835	48	450	75	0.549
1200 x 300	1200	90	1380	300	90	390	75	600	75	0.571
1200 x 450	1200	90	1380	450	90	540	75	600	75	0.636
1200 x 600	1200	90	1380	600	90	690	75	600	75	0.7
1200 x 750	1200	90	1380	750	90	840	75	600	75	0.765
1200 x 900	1200	90	1380	900	90	990	75	600	75	0.83
1200 x 1050	1200	90	1380	1050	90	1140	75	600	75	0.895
1200 x 1200	1200	90	1380	1200	90	1290	75	600	75	0.96
1500 x 600	1500	125	1750	600	135	735	150	900	180	1.322
1500 x 750	1500	125	1750	750	135	885	150	900	180	1.412
1500 x 900	1500	125	1750	900	135	1035	150	900	180	1.502
1500 x 1050	1500	125	1750	1050	135	1185	150	900	180	1.592
1500 x 1200	1500	125	1750	1200	135	1335	150	900	180	1.682
1500 x 1350	1500	125	1750	1350	135	1485	150	900	180	1.772
1500 x 1500	1500	125	1750	1500	135	1635	150	900	180	1.862
1800 x 750	1800	125	2050	750	135	885	150	900	180	1.639
1800 x 900	1800	125	2050	900	135	1035	150	900	180	1.729
1800 x 1050	1800	125	2050	1050	135	1185	150	900	180	1.819
1800 x 1200	1800	125	2050	1200	135	1335	150	900	180	1.909
1800 x 1350	1800	125	2050	1350	135	1485	150	900	180	1.999
1800 x 1500	1800	125	2050	1500	135	1635	150	900	180	2.089
1800 x 1650	1800	125	2050	1650	135	1785	150	900	180	2.179
1800 x 1800	1800	125	2050	1800	135	1935	150	900	180	2.269

# Super-Size LTH Precast RC U-Drain without DWF

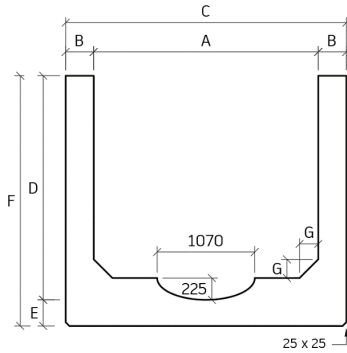


LTH Precast RC Super-size U-Drain without DWF



Nominal size (A x D) mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	Weight tonne
2100 x 900	2100	205	2510	900	205	1105	150	2.173
2100 x 1050	2100	205	2510	1050	205	1255	150	2.321
2100 x 1200	2100	205	2510	1200	205	1405	150	2.468
2100 x 1350	2100	205	2510	1350	205	1555	150	2.616
2100 x 1500	2100	205	2510	1500	205	1705	150	2.763
2100 x 1650	2100	205	2510	1650	205	1855	150	2.911
2100 x 1800	2100	205	2510	1800	205	2005	150	3.059
2100 x 1950	2100	205	2510	1950	205	2155	150	3.206
2100 x 2100	2100	205	2510	2100	205	2305	150	3.354
2400 x 1050	2400	205	2810	1050	205	1255	150	2.468
2400 x 1200	2400	205	2810	1200	205	1405	150	2.616
2400 x 1350	2400	205	2810	1350	205	1555	150	2.763
2400 x 1500	2400	205	2810	1500	205	1705	150	2.911
2400 x 1650	2400	205	2810	1650	205	1855	150	3.059
2400 x 1800	2400	205	2810	1800	205	2005	150	3.206
2400 x 1950	2400	205	2810	1950	205	2155	150	3.354
2400 x 2100	2400	205	2810	2100	205	2305	150	3.501
2400 X 2250	2400	205	2810	2250	205	2455	150	3.649
2400 X 2400	2400	205	2810	2400	205	2605	150	3.797
2700 x 1050	2700	205	3110	1050	205	1255	150	2.616
2700 x 1200	2700	205	3110	1200	205	1405	150	2.763
2700 x 1350	2700	205	3110	1350	205	1555	150	2.911
2700 x 1500	2700	205	3110	1500	205	1705	150	3.059
2700 x 1650	2700	205	3110	1650	205	1855	150	3.206
2700 x 1800	2700	205	3110	1800	205	2005	150	3.354
2700 x 1950	2700	205	3110	1950	205	2155	150	3.501
2700 x 2100	2700	205	3110	2100	205	2305	150	3.649
2700 x 2250	2700	205	3110	2250	205	2455	150	3.797
2700 x 2400	2700	205	3110	2400	205	2605	150	3.944
2700 x 2550	2700	205	3110	2550	205	2755	150	4.092
2700 x 2700	2700	205	3110	2700	205	2905	150	4.239
3000 x 1200	3000	205	3410	1200	205	1405	150	2.911
3000 x 1350	3000	205	3410	1350	205	1555	150	3.059
3000 x 1500	3000	205	3410	1500	205	1705	150	3.206
3000 x 1650	3000	205	3410	1650	205	1855	150	3.354
3000 x 1800	3000	205	3410	1800	205	2005	150	3.501
3000 x 1950	3000	205	3410	1950	205	2155	150	3.649
3000 x 2100	3000	205	3410	2100	205	2305	150	3.797
3000 x 2250	3000	205	3410	2250	205	2455	150	3.944
3000 x 2400	3000	205	3410	2400	205	2605	150	4.092
3000 x 2550	3000	205	3410	2550	205	2755	150	4.239
3000 x 2700	3000	205	3410	2700	205	2905	150	4.387
3000 x 2850	3000	205	3410	2850	205	3055	150	4.535
3000 x 3000	3000	205	3410	3000	205	3205	150	4.682
3300 x 1500	3300	205	3710	1500	205	1705	150	3.354
3300 x 1650	3300	205	3710	1650	205	1855	150	3.501
3300 x 1800	3300	205	3710	1800	205	2005	150	3.649
3300 x 1950	3300	205	3710	1950	205	2155	150	3.797
3300 x 2100	3300	205	3710	2100	205	2305	150	3.944
3300 x 2250	3300	205	3710	2250	205	2455	150	4.092
3300 x 2400	3300	205	3710	2400	205	2605	150	4.239
3300 x 2550	3300	205	3710	2550	205	2755	150	4.387
3600 x 2550	3600	205	4010	2550	205	2755	150	4.535
3600 x 2700	3600	205	4010	2700	205	2905	150	4.682
3600 x 2850	3600	205	4010	2850	205	3055	150	4.830
3600 x 3000	3600	205	4010	3000	205	3205	150	4.977
3600 x 3150	3600	205	4010	3150	205	3355	150	5.125
3600 x 3300	3600	205	4010	3300	205	3505	150	5.273
3600 x 3450	3600	205	4010	3450	205	3655	150	5.420
3600 x 3600	3600	205	4010	3600	205	3805	150	5.568

# Super-Size LTH Precast RC U-Drain with DWF



LTH Precast RC Super-size U-Drain with DWF

Nominal size (A x D) mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	Weight tonne
2100 x 900	2100	205	2510	900	205	1105	150	2.853
2100 x 1050	2100	205	2510	1050	205	1255	150	3.001
2100 x 1200	2100	205	2510	1200	205	1405	150	3.148
2100 x 1350	2100	205	2510	1350	205	1555	150	3.296
2100 x 1500	2100	205	2510	1500	205	1705	150	3.444
2100 x 1650	2100	205	2510	1650	205	1855	150	3.591
2100 x 1800	2100	205	2510	1800	205	2005	150	3.739
2100 x 1950	2100	205	2510	1950	205	2155	150	3.886
2100 x 2100	2100	205	2510	2100	205	2305	150	4.034
2400 x 1050	2400	205	2810	1050	205	1255	150	3.310
2400 x 1200	2400	205	2810	1200	205	1405	150	3.458
2400 x 1350	2400	205	2810	1350	205	1555	150	3.606
2400 x 1500	2400	205	2810	1500	205	1705	150	3.753
2400 x 1650	2400	205	2810	1650	205	1855	150	3.901
2400 x 1800	2400	205	2810	1800	205	2005	150	4.048
2400 x 1950	2400	205	2810	1950	205	2155	150	4.196
2400 x 2100	2400	205	2810	2100	205	2305	150	4.344
2400 X 2250	2400	205	2810	2250	205	2455	150	4.491
2400 X 2400	2400	205	2810	2400	205	2605	150	4.639
2700 x 1050	2700	205	3110	1050	205	1255	150	3.620
2700 x 1200	2700	205	3110	1200	205	1405	150	3.768
2700 x 1350	2700	205	3110	1350	205	1555	150	3.915
2700 x 1500	2700	205	3110	1500	205	1705	150	4.063
2700 x 1650	2700	205	3110	1650	205	1855	150	4.210
2700 x 1800	2700	205	3110	1800	205	2005	150	4.358
2700 x 1950	2700	205	3110	1950	205	2155	150	4.506
2700 x 2100	2700	205	3110	2100	205	2305	150	4.653
2700 x 2250	2700	205	3110	2250	205	2455	150	4.801
2700 x 2400	2700	205	3110	2400	205	2605	150	4.948
2700 x 2550	2700	205	3110	2550	205	2755	150	5.096
2700 x 2700	2700	205	3110	2700	205	2905	150	5.244
3000 x 1500	3000	205	3410	1500	205	1705	150	4.372
3000 x 1650	3000	205	3410	1650	205	1855	150	4.520
3000 x 1800	3000	205	3410	1800	205	2005	150	4.668
3000 x 1950	3000	205	3410	1950	205	2155	150	4.815
3000 x 2100	3000	205	3410	2100	205	2305	150	4.963
3000 x 2250	3000	205	3410	2250	205	2455	150	5.110
3000 x 2400	3000	205	3410	2400	205	2605	150	5.258
3000 x 2550	3000	205	3410	2550	205	2755	150	5.406
3000 x 2700	3000	205	3410	2700	205	2905	150	5.553
3000 x 2850	3000	205	3410	2850	205	3055	150	5.701
3000 x 3000	3000	205	3410	3000	205	3205	150	5.848
3300 x 1500	3300	205	3710	1500	205	1705	150	4.682
3300 x 1650	3300	205	3710	1650	205	1855	150	4.830
3300 x 1800	3300	205	3710	1800	205	2005	150	4.977
3300 x 1950	3300	205	3710	1950	205	2155	150	5.125
3300 x 2100	3300	205	3710	2100	205	2305	150	5.272
3300 x 2250	3300	205	3710	2250	205	2455	150	5.420
3300 x 2400	3300	205	3710	2400	205	2605	150	5.568
3300 x 2550	3300	205	3710	2550	205	2755	150	5.715
3300 x 2700	3300	205	3710	2700	205	2905	150	5.863
3300 x 2850	3300	205	3710	2850	205	3055	150	6.010
3300 x 3000	3300	205	3710	3000	205	3205	150	6.158
3300 x 3150	3300	205	3710	3150	205	3355	150	6.306
3300 x 3300	3300	205	3710	3300	205	3505	150	6.453
3600 x 1500	3600	205	4010	1500	205	1705	150	4.992
3600 x 1650	3600	205	4010	1650	205	1855	150	5.139
3600 x 1800	3600	205	4010	1800	205	2005	150	5.287
3600 x 1950	3600	205	4010	1950	205	2155	150	5.434
3600 x 2100	3600	205	4010	2100	205	2305	150	5.582
3600 x 2250	3600	205	4010	2250	205	2455	150	5.730
3600 x 2400	3600	205	4010	2400	205	2605	150	5.877
3600 x 2550	3600	205	4010	2550	205	2755	150	6.025
3600 x 2700	3600	205	4010	2700	205	2905	150	6.172
3600 x 2850	3600	205	4010	2850	205	3055	150	6.320
3600 x 3000	3600	205	4010	3000	205	3205	150	6.468
3600 x 3150	3600	205	4010	3150	205	3355	150	6.615
3600 x 3300	3600	205	4010	3300	205	3505	150	6.763
3600 x 3450	3600	205	4010	3450	205	3655	150	6.910
3600 x 3600	3600	205	4010	3600	205	3805	150	7.058

