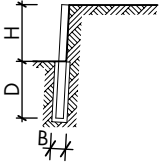
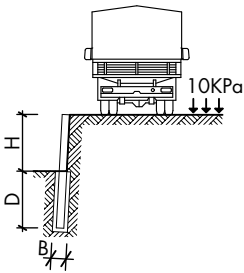
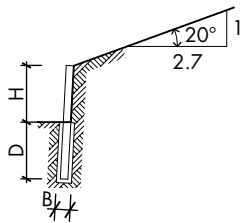


Level backfill, no surcharge – normal density poles


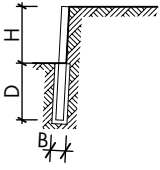
H (m)	SED (mm)	UniLog Ø (mm)	Min. B (mm)	Min. D (m)	Standard TTT Pole Length (m)	SG8 RS Rails	SG6 RS Rails
0.8	150	155	300	0.8	1.8	150x50	150x50
1.0	150	155	300	1.0	2.4	150x50	150x75
1.2	150	180	300/350	1.2	2.4	150x50	150x75
1.4	175	200	350/400	1.4	3.0	150x50	150x75
1.6	200		400	1.6	3.6	150x75	150x75
1.8	225		400	1.8	3.6	150x75	150x75
2.0	250		450	2.0	4.2	150x75	150x75
2.2	275		450	2.2	4.8	150x75	150x100
2.4	300		500	2.4	4.8	150x75	150x100
2.6	325		500	2.6	5.4	150x75	150x100
2.8	350		500	2.8	6.0	150x75	150x100
3.0	375		600	3.1	7.0	150x75	150x100
3.2	400		600	3.5	7.0	150x75	150x100

10 kPa surcharge – normal density poles


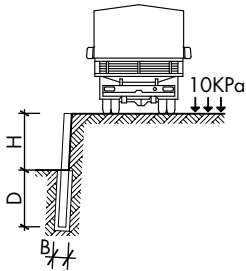
H(m)	SED(mm)	UniLog Ø(mm)	Min. B(mm)	Min. D(m)	Standard TTT Pole Length (m)	SG8 RS Rails	SG6 RS Rails
0.8	175	180	350	1.0	1.8	150x50	150x75
1.0	200	200	400	1.2	2.4	150x75	150x75
1.2	225		400	1.4	3.0	150x75	150x75
1.4	225		400	1.6	3.0	150x75	150x75
1.6	250		450	1.8	3.6	150x75	150x100
1.8	275		450	2.1	4.2	150x75	150x100
2.0	300		500	2.4	4.8	150x75	150x100
2.2	325		500	2.7	5.4	150x75	150x100
2.4	350		500	3.0	5.4	150x75	150x100
2.6	375		600	3.3	6.0	150x75	150x100
2.8	400		600	3.6	7.0	150x75	150x100

Sloping backfill – 1V : 2.7H (min.) – normal density poles


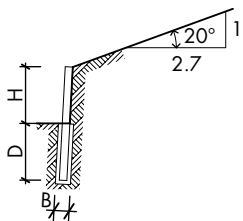
H(m)	SED(mm)	UniLog Ø(mm)	Min.B(mm)	Min. D(m)	Standard TTT Pole Length (m)	SG8 RS Rails	SG6 RS Rails
0.8	150	155	300	0.8	1.8	150x50	150x75
1.0	150	155	300	1.0	2.4	150x50	150x75
1.2	175	180	350	1.2	2.4	150x75	150x75
1.4	200	200	400	1.4	3.0	150x75	150x75
1.6	225		400	1.6	3.6	150x75	150x100
1.8	250		450	1.8	3.6	150x75	150x100
2.0	275		450	2.1	4.2	150x75	150x100
2.2	300		500	2.4	4.8	150x75	150x100
2.4	325		500	2.7	5.4	150x75	150x100
2.6	350		500	3.1	6.0	150x100	
2.7	375		600	3.2	6.0	150x100	
2.8	400		600	3.4	7.0	150x100	

Level backfill, no surcharge – high density poles


H(m)	SED(mm)	Min. B(mm)	Min. D(m)	Standard TTT Pole Length (m)	SG8 RS Rails	SG6 RS Rails
0.8	150	300	0.8	1.8	150x50	150x50
1.0	150	300	1.0	2.4	150x50	150x75
1.2	150	300	1.2	2.4	150x50	150x75
1.4	175	350	1.4	3.0	150x50	150x75
1.6	175	400	1.6	3.6	150x75	150x75
1.8	200	400	1.8	3.6	150x75	150x75
2.0	225	450	2.0	4.2	150x75	150x75
2.2	250	450	2.2	4.8	150x75	150x100
2.4	275	450	2.4	4.8	150x75	150x100
2.6	300	500	2.6	5.4	150x75	150x100
2.8	300	500	2.8	6.0	150x75	150x100
3.0	325	500	3.1	7.0	150x75	150x100
3.2	350	500	3.5	7.0	150x75	150x100
3.4	375	600	3.8	8.0	150x100	150x100
3.6	400	600	4.2	8.0	150x100	150x100

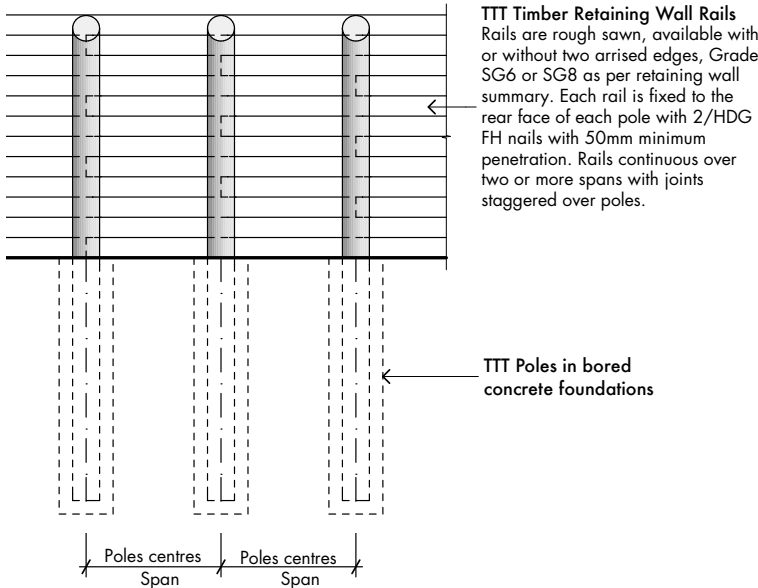
10 kPa surcharge – high density poles


H(m)	SED(mm)	Min. B(mm)	Min. D(m)	Standard TTT Pole Length (m)	SG8 RS Rails	SG6 RS Rails
0.8	150	300	1.0	1.8	150x50	150x75
1.0	175	350	1.2	2.4	150x75	150x75
1.2	200	400	1.4	3.0	150x75	150x75
1.4	225	400	1.6	3.0	150x75	150x75
1.6	225	400	1.8	3.6	150x75	150x100
1.8	250	450	2.1	4.2	150x75	150x100
2.0	275	450	2.4	4.8	150x75	150x100
2.2	300	500	2.7	5.4	150x75	150x100
2.4	325	500	3.0	5.4	150x75	150x100
2.6	350	500	3.3	6.0	150x75	150x100
2.8	375	600	3.6	7.0	150x100	150x100
3.0	400	600	4.0	7.0	150x100	150x100

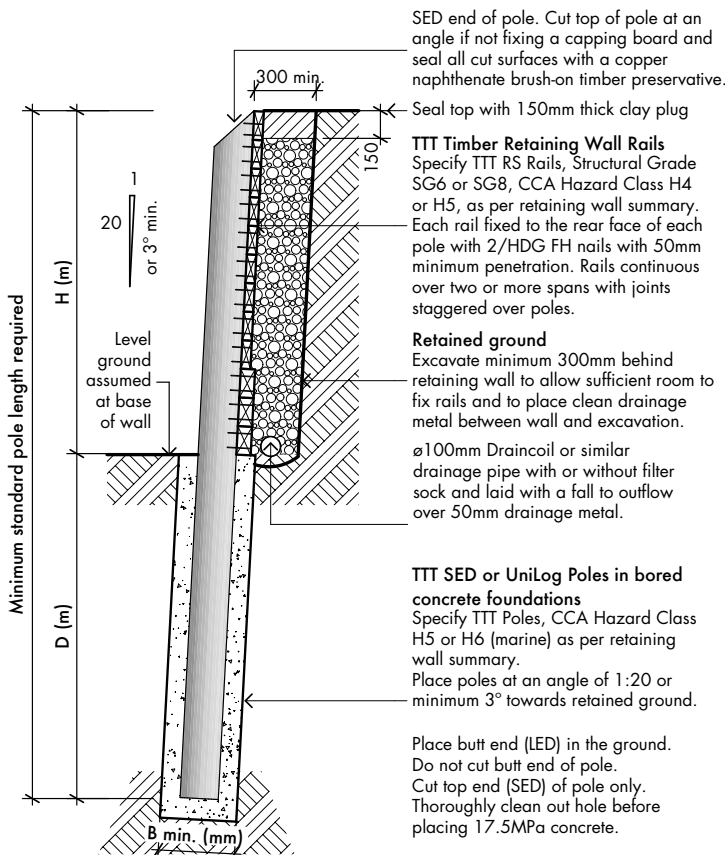
Sloping backfill – 1V : 2.7H (min.) – high density poles


H(m)	SED(mm)	Min.B(mm)	Min. D(m)	Standard TTT Pole Length (m)	SG8 RS Rails	SG6 RS Rails
0.8	150	300	0.8	1.8	150x50	150x75
1.0	150	300	1.0	2.4	150x50	150x75
1.2	150	300/350	1.2	2.4	150x75	150x75
1.4	175	350/400	1.4	3.0	150x75	150x75
1.6	200	400	1.6	3.6	150x75	150x100
1.8	225	400	1.8	3.6	150x75	150x100
2.0	250	450	2.1	4.2	150x75	150x100
2.2	275	450	2.4	4.8	150x75	150x100
2.4	300	500	2.7	5.4	150x75	150x100
2.6	325	500	3.1	6.0	150x100	
2.8	350	500	3.4	7.0	150x100	
3.0	375	600	3.8	7.0	150x100	
3.2	400	600	4.2	8.0	150x100	

Typical bored concrete foundation construction details



Typical front elevation



Typical retaining wall section with bored concrete foundation

Timber Retaining Wall Notes:

- 1) **Soil Conditions**
 Poles shall be founded in stiff clay (undisturbed ground or certified fill), with an ultimate bearing capacity of 300 kPa (i.e. 'good ground' as per NZS 3604:2011). For all other foundation conditions e.g. known unstable ground, sand, peat, soft clay or uncertified fill, or lower ground surface sloping away from wall, refer to a Chartered Professional Engineer for further advice.
- 2) **Wall Design Loads**
 Wall designs allow for the following loading:
 - a) Level backfill, no surcharge, Level ground above the wall, with no allowance for additional surcharge loading on the ground above the wall.
 - b) 10 kPa surcharge
 An additional uniformly distributed loading of up to 10 kPa (1 tonne/sq.m), applied to level ground above the wall. This loading allows for transient traffic loads, provided any wheel point loads are spread to simulate a 10 kPa uniformly distributed load.
 - c) Sloping backfill, no surcharge (1V : 2.7H min.) Ground above the wall at a slope of 1 vertical to a minimum of 2.7 horizontal, i.e. at a maximum slope angle of 20 degrees.
- 3) **Local Authority Requirements**
 Most retaining walls are likely to require a building consent (especially adjacent to boundaries). Check with your Local Authority for specific guidance prior to commencing work.
- 4) **Timber Retaining wall material**
 (New Zealand Pinus Radiata)
 - a) TTT Poles
 TTT SED Poles (peeled, naturally tapered) are available as normal or high density poles with a minimum taper of 6mm/m as per NZS3605:2001 and treated to a minimum CCA Hazard Class H5 as per NZS 3640:2003.
 UniLog Poles (machined, uniform diameter) are available as normal density poles and treated to a minimum CCA Hazard Class H5 as per NZS 3640:2003.
 - b) TTT Timber Retaining Rails
 Timber rails are rough sawn and available with or without two edges arrised - Grade SG8 or SG6 as per NZS 3622:2004 and sized as per retaining wall summaries and treated to a minimum CCA Hazard Class H4 or H5 as per NZS 3640:2003. Rails to be continuous over a minimum of two spans.
- 5) **Cutting pole ends**
 Do not cut end of pole to be placed in the ground. Coat all cut pole tops with a brush-on copper naphthenate timber preservative.
- 6) **Health and safety**
 Your safety is important when working with CCA treated timber.
 - Carry out all cutting, sanding and so on outside.
 - Wear a filter mask, gloves and goggles when cutting and sawing.
 - Take particular care when the timber surface is wet or has crystalline chemical deposits on it.
 - Clean up (timber scraps, sawdust) thoroughly afterwards.
 - Dispose of waste to an approved (municipal) waste disposal area.
 - Do not compost or mulch waste.
 - Do not burn waste.
 - Wash your hands before eating, drinking or smoking.
 - Wash exposed areas of your body after working with treated timber.
 - Wash work clothes separately from other clothes.
- 7) **Disclaimer**
 TTT Products Limited has used all reasonable endeavours to ensure the accuracy and reliability of the information contained in this document. However, TTT Products Limited assumes no responsibility or liability for any inaccuracies, omissions or errors in this information nor for any actions taken in reliance on this information. All content remains the property of TTT Products Limited, and is subject to change.

<p>TTT Products Limited P 0800 UNILOG (864 564) P +64 9 236 8880 F +64 9 236 8663</p>	<p>www.unilog.co.nz TTT Products Limited Bollard Rd, PO Box 99 Tuakau 2342, New Zealand</p> 	<p>SED Poles, Uglies, MultiPoles, Utility Poles, Marine Poles, Proof Tested Poles</p> <p>Uniform diameter machined poles</p>
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Revolutionary timber pole solutions