Modular Drainage System
Long Term Load Fatigue

Test date:	16/04/24	**Machine:**	SiPlan 100 kN fatigue machine	**Temperature:**	23.0 °C
Tester:	CDM	**Strain measurement:**	Crosshead	**Humidity:**	50.0 % RH
Vernier:	Digital (M54, 74)	**Test frequency:**	2 Hz	**Load levels:**	-0.2 kN to -2 kN

Height				Time	Date	Comment	Graph
1	2	3	Avg.				
100.08	100.6	99.36	100.01		16/04/2024		C10F-4 Part 1 Cycles 254
98.07	98.44	95.86	97.46	10:06:00	16/04/2024	After test	
98.79	98.74	99.11	98.88	10:37:00	16/04/2024	After relax	
98.36	98.36	98.78	98.5	10:43:00	16/04/2024	After test	C10F-4 Part 2 Cycles 255
98.98	98.6	99.44	99.01	11:15:00	16/04/2024	After relax	
97.45	97.72	98.21	97.79	12:12:00	16/04/2024	After test	C10F-4 Part 3
98.49	98.52	98.89	98.63	12:46:00	16/04/2024	After relax	Cycles 6506
Machine cut out outside working hours after 131,673 cycles				07:15:00	17/04/2024		No 'After test' measure recorded for Part 4
97.75	96.66	97.12	97.18	08:15:00	17/04/2024	After relax	Cycles 131,673
96.14	95.87	96.76	96.26	15:51:00	17/04/2024	After test	C10F-4 Part 5
97.43	97.12	97.26	97.27	16:21:00	17/04/2024	After relax	Cycles 54,001
95.79	95.69	95.65	95.71	11:55:00	19/04/2024	After test	C10F-4 Part 6 Cycles 313, 321
96.24	95.93	96.09	96.09	12:25:00	19/04/2024	After relax	
97.34	96.73	97.32	97.13	09:50:00	22/04/2024	After long relax	
97.79	97.42	97.02	97.41	08:45:00	25/04/2024	After long relax	
							Total Cycles 506,010

Design Life Analysis:

Expected Design Life: 60 years
(Based on known lateral forces within the active load zone and or 6ft drainage, under cycle loading across a range of 50kPa to 95kPa)

Area Calculation for a Diameter of 114.32 mm:
- **Diameter:** 0.11432 m
- **Radius:** 0.05716 m
- **Area of Circle:** 0.010264 m²

Pressure Calculation for a Load of 2.0 kN:
- **Force (F):** 2.0 kN × 1,000 = 2,000 N
- **Pressure (P):** 2,000 N / 0.010264 m² ≈ 194.93 kPa

Deflection: No greater than 5%
(Based on a safety factor range from 2x to 3.8x depending upon loading)

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