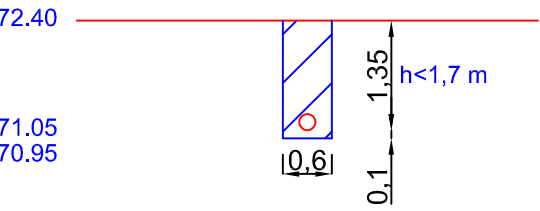


RAINWATER EXCAVATIONS

1a

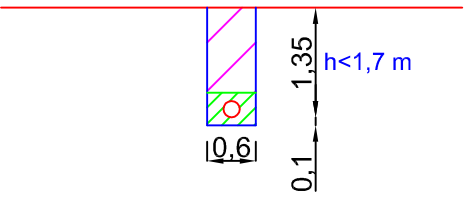
RAINWATER PIPE ø200(lake):

Area: 0,87 m²



Volumen excavation: 0,87 m² x 9,43= 8,2m³

BACKFILLING



L= 9,43 m

Soil area= 0,63 m²
Soil volume= 0,63 x 9,43= 5,94 m³

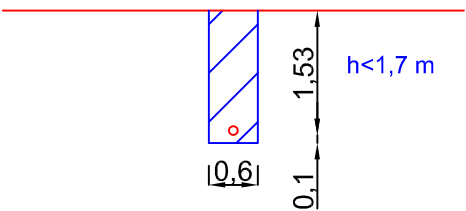
Sand:
0,24 m² x 9,43 m = 2,26 m³
Volume pipe= $\pi r^2 \cdot h = \pi 0,1^2 \times 9,43 = 0,29 \text{ m}^3$

Total Volume sand:
2,26-0,29= 1,96 m³

1b

RAINWATER PIPE ø110:

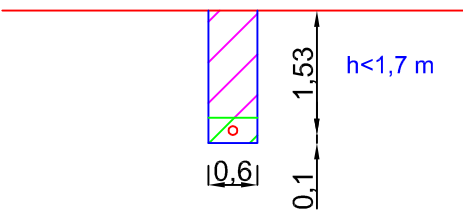
Area: 0,97 m²



L= 50,11 m

Volumen excavation: 0,97 m² x 50,11= 49,6m³

BACKFILLING



L= 50,11 m

Soil area= 0,79 m²
Soil volume= 0,79 x 50,11= 39,58 m³

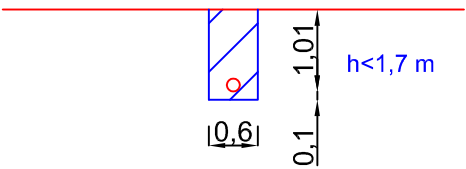
Sand:
0,18 m² x 50,11 m = 9,02 m³
Volume pipe= $\pi r^2 \cdot h = \pi 0,05^2 \times 50,11 = 0,39 \text{ m}^3$

Total Volume sand:
9,02-0,39= 8,62 m³

1c

RAINWATER PIPE ø160:

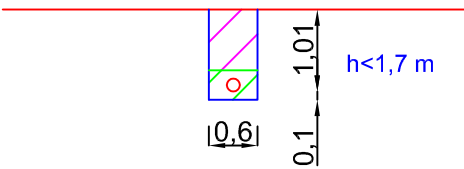
Area: 0,66 m²



L= 24,12 m

Volumen excavation: 0,66 m² x 24,12= 15,92 m³

BACKFILLING



L= 24,12 m

Soil area= 0,45 m²
Soil volume= 0,45 x 24,12= 10,85 m³

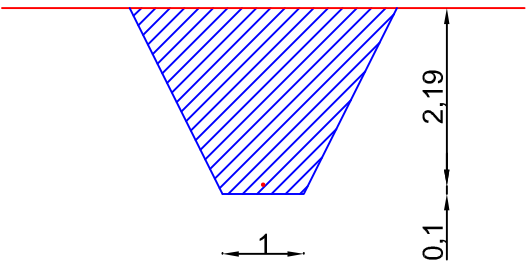
Sand:
0,21 m² x 24,12 m = 5,06 m³
Volume pipe= $\pi r^2 \cdot h = \pi 0,08^2 \times 24,12 = 0,48 \text{ m}^3$

Total Volume sand:
5,06-0,48= 4,57 m³

1d

Pressure line 10 ø32 :

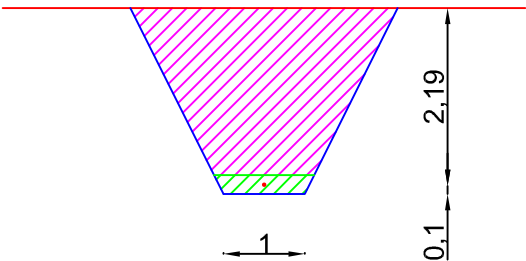
Area: 4,91 m²



L= 9,8 m

Volumen excavation: 4,91 m² x 9,8= 48,12 m³

BACKFILLING



L= 9,8 m

Soil area= 4,65 m²
Soil volume= 4,65 x 9,8= 45,57 m³

Sand:
0,26 m² x 9,8 m = 2,55 m³
Volume pipe= $\pi r^2 \cdot h = \pi 0,016^2 \times 9,8 = 0,0078 \text{ m}^3$

Total Volume sand:
2,55-0,0078= 2,54 m³