



BWT Tekening 3

Gemeente Heemskerk

PROVINCIAAL ELECTRICITEITSBEDRIJF
VAN NOORD-HOLLAND

CIVIELTECHNISCHE- EN BOUWKUNDIGE ZAKEN

Behoort bij besluit van
de Raad van Heemskerk
B. en V.
dd. 18 jan. 1972 no. 60
Mij beaant:
De Secretaris van Heemskerk,

30 DEC 1971

Afdeling Ontwerpen en tekenkamer

STATISCHE BEREKENINGEN

Werk:

TRANSFORMATORSTATION G_1000
OP PALEN

Berekend	
Gecontroleerd	
Gewijzigd	
Tekeningnummer	
Aantal bladen	11

totale belasting:

dak:

bimsbetonkanalplaten
afwerklaag
nuttige belasting
bedekking
dakranden

$5.39^5 \times 2.64^5 \times 1.50$	=	2140	kg
$5.39^5 \times 2.64^5 \times 0.08 \times 2400$	=	2740	"
$5.93^5 \times 2.96^5 \times 100$	=	1760	"
$5.93^5 \times 2.96^5 \times 20$	=	352	"
$0.27 \times 0.35 \times 2.96^5 \times 2 \times 2400$	=	1350	"
$0.16 \times 0.40 \times 5.39^5 \times 2 \times 2400$	=	1660	"

begane grondvloer:

eigen gewicht
nuttige belasting
balken

$5.61^5 \times 2.64^5 \times 0.12^5 \times 2400$	=	4450	"
$5.39^5 \times 2.42^5 \times 200$	=	2620	"
$0.30 \times 0.25 \times 2.64^5 \times 2400 \times 2$	=	953	"

keldervloer:
eigen gewicht
nuttige belasting

$5.93^5 \times 2.96^5 \times 0.20 \times 2400$	=	8450	"
$5.27^5 \times 2.30^5 \times 100$	=	1215	"

metsel werk:

11-5-11
33

$16.72 \times 2.75 \times 400$	=	18400	"
$16.48 \times 0.62^5 \times 600$	=	6150	"

transformatie

1×3500	=	3500	"
-----------------	---	------	---

cookkast

1×1200	=	1200	"
-----------------	---	------	---

total = 56970 kg

belasting per pal $\frac{56970}{8} = 7.15$ ton.

funderingsplaat:

versierke stroken kopgevels

$$l_b = 24,6^5 \text{ cm.}$$

$$h = 20 - 2 - 1 = 17 \text{ cm.}$$

$$d^1 = 2+1 = 3 \text{ cm.}$$

$$d^1 = 1^5+1 = 2^5 \text{ cm.}$$

belasting:

dakrand

$$0,40 \times 0,27 \times 2400$$

$$= 260 \text{ kgf/m'}$$

begane grondvloer

$$\frac{1,50}{2} \times 500$$

$$= 375 \text{ " "}$$

kelder vloer

$$\frac{1,90}{2} \times 580$$

$$= 570 \text{ " "}$$

metselwerk 11.5-11

$$2,75 \times 400$$

$$= 1100 \text{ " "}$$

33

$$0,62^5 \times 600$$

$$= 375 \text{ " "}$$

leesnformator

$$\frac{1,750}{2,46^5}$$

$$= 710 \text{ " "}$$

eigen gewicht versierke strook. $0,50 \times 0,20 \times 2400$

$$= 240 \text{ " "}$$

$$\text{totaal} = 3630 \text{ kgf/m'}$$

afmeting strook $20 \times$ aangenomen 50 cm.

$$l_b = 24,6^5 \text{ cm.}$$

 $m_{max.}$

$$= \frac{1}{8} \times 3630 \times (24,6^5)^2$$

$$= 2750 \text{ kgfm.}$$

 m_{u1}

$$= \left(\frac{17}{0,258} \right)^2 \times 0,50$$

$$= 2170 \text{ kgfm.}$$

 m_{u2}

$$= 580 \text{ kgfm.}$$

$$h = 17 = 0,258 \sqrt{\frac{2170}{0,50}}$$

$$A_1 = 0,0034 \times \frac{2170}{17} = 11,9 \text{ cm}^2$$

$$A_2 = \frac{54800}{2400(20-3-2^5)} = 1,67 \text{ cm}^2$$

$$A_{\text{totaal}} = 13,57 \text{ cm}^2$$

$$\text{neem } 5 \phi 19 \text{ (14,2 cm}^2\text{) } a+b.$$

versterkte strook zijgevels.

$$l_b = 215 \text{ cm.}$$

belasting:

$$a) \text{ dak: bimsbetonkanalplaten: } \frac{264^5}{2} \times 150 = 198 \text{ kgf/m}^1$$

$$\text{d'fwerklaag: } \frac{264^5}{2} \times 0.08 \times 2400 = 254 \text{ " "}$$

$$\text{dakbedekking: } \frac{296^5}{2} \times 20 = 29 \text{ " "}$$

$$\text{dakrand: } 0.16 \times 0.40 \times 2400 = 154 \text{ " "}$$

$$\text{nuttige belasting } \frac{296^5}{2} \times 100 = 149 \text{ " "}$$

$$b) \text{ meubelwerk: } 11.5 \cdot 11 \cdot 33 \quad \begin{array}{l} = 1100 \\ = 375 \end{array} \quad \begin{array}{l} \text{" "} \\ \text{" "} \end{array}$$

$$c) \text{ begane grondvloer: } \frac{186}{2} \times 500 = 463 \text{ " "}$$

$$d) \text{ kelder vloer: } \frac{196^5}{2} \times 580 = 570 \text{ " "}$$

$$e) \text{ brandvormaalbor: } \frac{875}{2.15} = 408 \text{ " "}$$

$$f) \text{ eigen gewicht strook: } 0.50 \times 0.20 \times 2400 \quad \begin{array}{l} \text{bobaal} \\ = 240 \end{array} \quad \begin{array}{l} = 3940 \text{ kgf/m}^1 \\ \text{" "} \end{array}$$

$$d = 2+1.9+1 = 4.9 \text{ cm.}$$

$$d^1 = 1^5+1.9+1 = 4.4 \text{ cm.}$$

$$m_v = m_1 = 1/10 \times 3940 \times 2.15^2 = 1830 \text{ kgfm}$$

$$m_{u1} = \left(\frac{15.1}{0.258} \right)^2 \times 0.50 = 1710 \text{ " "}$$

$$m_{u2} = 120 \text{ kgfm.}$$

$$A_1 = 0.0934 \times \frac{1710}{15.1} = 10.6 \text{ cm}^2$$

$$A = \frac{12000}{24.00 (20.44 - 4.9)} = 0.46 \text{ cm}^2$$

$$A \text{ bobaal} = 11.06 \text{ cm}^2$$

$$\text{neem } 4 \phi 19 \text{ (11.36 cm}^2\text{)}$$

Funderingsvloer:

$$l_y = 4.93^5 + 5 = 4.98^5 \text{ m.}$$

$$l_x = 1.96^5 + 5 = 2.01^5 \text{ m.}$$

$$l_y / l_x = \frac{4.98^5}{2.01^5} = 2.48$$

$$h = 20 \cdot 2 \cdot 0^5 = 17.5 \text{ cm.}$$

eigen gewicht	20x24	= 480	kgf/m ²
nuttige belasting		= 100	" "
		q = 580	kgf/m ²

$$M_{vx} = 0.112 \times 580 \times 2.015^2 = 262 \text{ kgfm.}$$

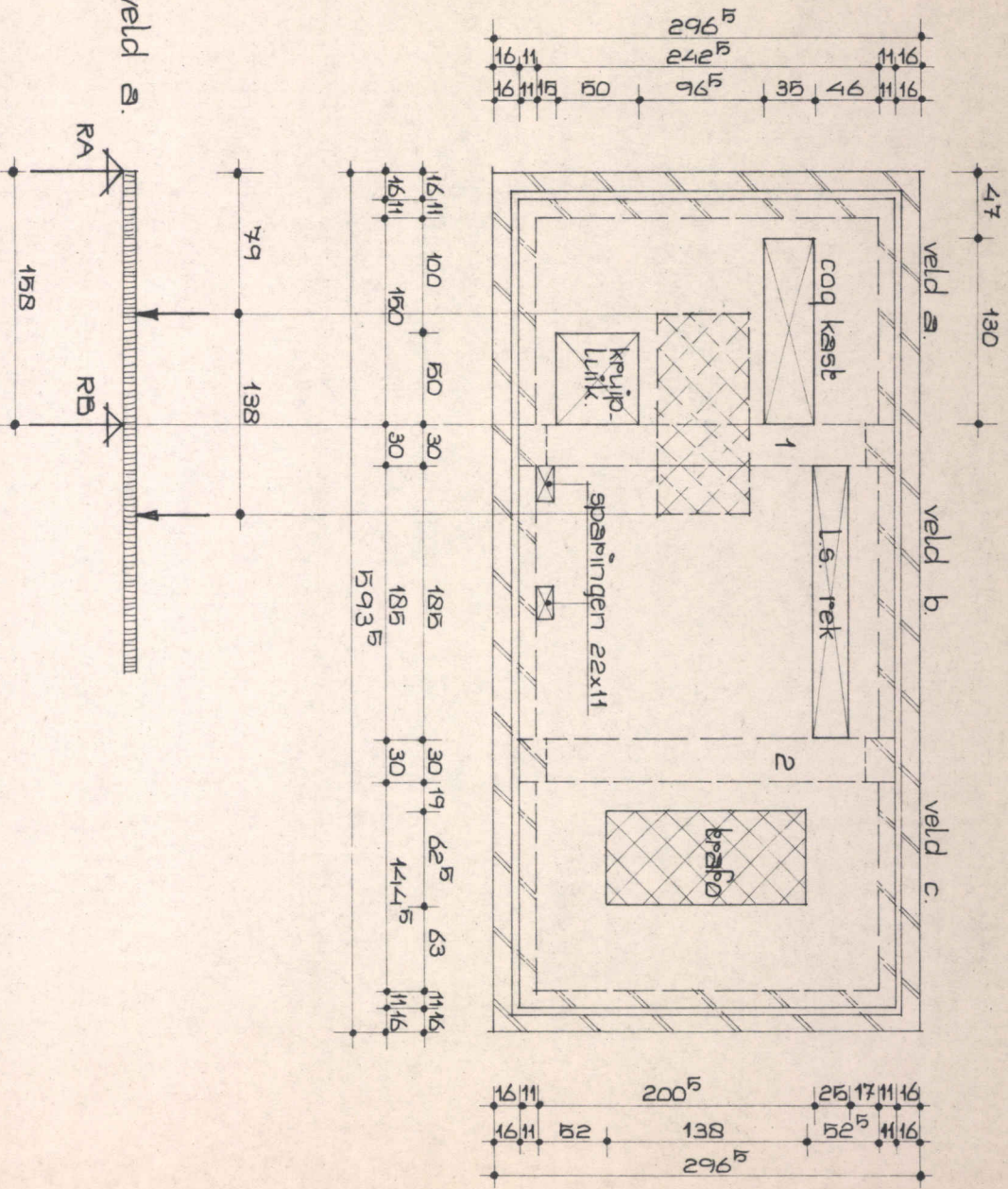
$$M_{vy} = 0.032 \times 580 \times 2.015^2 = 75 \text{ kgfm.}$$

$$h = 17^5 = 1.8 \sqrt{262}$$

$$A_{min} = 0.25 \% \times 20 \times 100 = 5 \text{ cm}^2$$

$$\text{neem } \phi 10-15 \quad (5.24 \text{ cm}^2)$$

begane grondvloer



138 > 0.586 x 158 = 93 → m_{max} als één stel wielen in het midden van het veld staat.

$l_1 = 158$ cm. $l_2 = 96^5$ cm. $b_1 = 138$ cm. $b_2 = 62^5$ cm. $r = \frac{2}{3}$.

$h_b = 12^5$ cm. $h = 12^5 - 1.07 = 10.8$ cm. gewichte transformator = 3500 kg.

$$s = 1 + \frac{3}{10 + 1.58} = 1.259$$

$$P.s. = 1.259 \times 3500 = 4400 \text{ kgf.} \rightarrow P = \frac{4400}{2} = 2200 \text{ kgf.}$$

$$s_a = \frac{62^5 + \frac{2}{3} \times 158}{96^5 + \frac{2}{3} \times 158} \times 96^5 = \frac{167^5}{201^5} \times 96^5 = 80 \text{ cm.}$$

nuttige belasting:
eigen gewicht: $12^5 \times 24$

$$q = 500 \text{ kgf/m}^2$$

$$m_p = \frac{1}{4} \times 2200 \times 1.58$$

$$m_{i1} = \frac{870}{0.80}$$

$$m_d = \frac{1}{8} \times 500 \times 1.58^2$$

$$= 870 \text{ kgfm.}$$

$$= 1090 \text{ kgfm.}$$

$$= 155 \text{ kgfm.}$$

$$\text{totaal} = 1245 \text{ kgfm.}$$

$$m_v = \frac{5}{6} \times 1245$$

$$m_i = -\frac{4}{5} \times 1245$$

$$= 1035 \text{ kgfm.}$$

$$= 995 \text{ kgfm.}$$

$$10.8 = 0.329 \sqrt{\frac{1035}{0.965}}$$

$$A = 0.0842 \times \frac{1035}{10.8} = 8.07 \text{ cm}^2$$

$$\text{neem } \phi 14-18 \text{ (8.55 cm}^2\text{) o+b}$$

$$m_{i2} = \frac{1245}{1+4 \times \frac{0.25}{0.65}} = \frac{1245}{3.59} = 347 \text{ kgfm} \rightarrow \text{veld c maatgevend.}$$

veld c.

$$l_y = 253^5 \text{ cm.}$$

$$l_x = 152^5 \text{ cm.}$$

$$b_x = 62^5 \text{ cm.}$$

$$b_y = 138 \text{ cm.}$$

$$l_y/l_x = 253^5/152^5 = 1.67.$$

$$h_b = 12^5 \text{ cm.}$$

$$P.S. = 4400 \text{ kgf.}$$

$$q = 500 \text{ kgf/m}^2$$

tabel XII - I

$$m_x = a_1 = -0.062.$$

$$a_2 = -0.052.$$

$$a_3 = 0.258.$$

$$a_4 = 0.775.$$

tabel XII - VII

$$m_1 = a_1 = -0.001.$$

$$a_2 = -0.116.$$

$$a_3 = 0.178.$$

$$a_4 = 0.536.$$

$$m_{1x} = a_1 = 0.024.$$

$$a_2 = 0.249.$$

$$a_3 = -0.520.$$

$$a_4 = 1.561.$$

$$m_x = \frac{-0.062 \times \frac{0.62^5}{1.52^5} - 0.052 \times \frac{1.38}{2.53^5} + 0.258}{\frac{0.62^5}{1.52^5} + \frac{1.38}{2.53^5} + 0.775} \times 4400 =$$

$$\frac{-0.02254 - 0.0283 + 0.258}{0.41 + 0.544 + 0.775} \times 4400 = \underline{\underline{520 \text{ kgfm.}}}$$

$$m_y = \frac{-0.001 \times \frac{0.62^5}{1.52^5} - 0.116 \times \frac{1.38}{2.53^5} + 0.178}{\frac{0.62^5}{1.52^5} + \frac{1.38}{2.53^5} + 0.536} \times 4400 =$$

$$\frac{-0.00041 - 0.063 + 0.178}{0.41 + 0.544 + 0.536} \times 4400 = \underline{\underline{340 \text{ kgfm}}}$$

$$m_{1x} = \frac{0.024 \times \frac{0.62^5}{1.52^5} + 0.249 \times \frac{1.38}{2.53^5} - 0.520}{\frac{0.62^5}{1.52^5} + \frac{1.38}{2.53^5} + 1.561} \times 4400 =$$

$$\frac{0.00985 + 0.1355 - 0.520}{0.41 + 0.544 + 1.561} \times 4400 = \underline{\underline{656 \text{ kgfm.}}}$$

belasting b.q.v. q tabel VIII - VB

$$m_{1x} = m_{yx} = 0.086 \times 500 \times 1.525^2 = 100 \text{ kgfm.}$$

$$m_{vy} = 0.020 \times 500 \times 1.525^2 = 23 \text{ kgfm.}$$

$$m_y \text{ bobasal} = 520 + 100 = 620 \text{ kgfm.} \leftarrow \text{veld a. masabgevend.}$$

$$m_y \text{ bobasal} = 340 + 23 = 363 \text{ kgfm.}$$

$$m_{ix} \text{ bobasal} = \frac{260 + 656}{2} + 100 = 558 \text{ kgfm.} \leftarrow \text{veld a. masabgevend.}$$

$$h = 12^5 - 1 - 1^4 - 0^5 = 9.6 \text{ cm.}$$

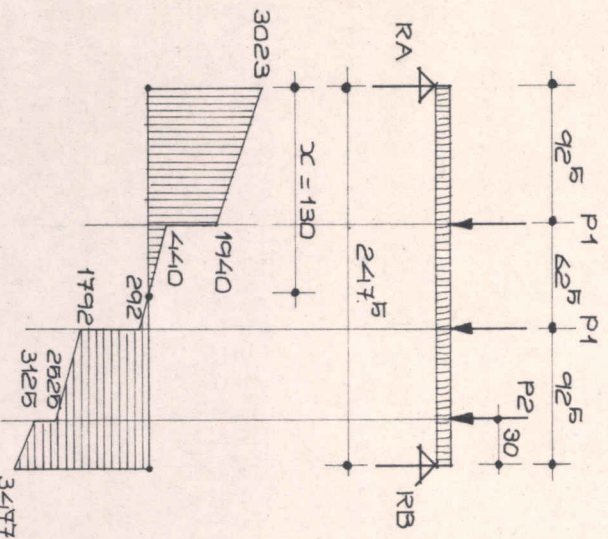
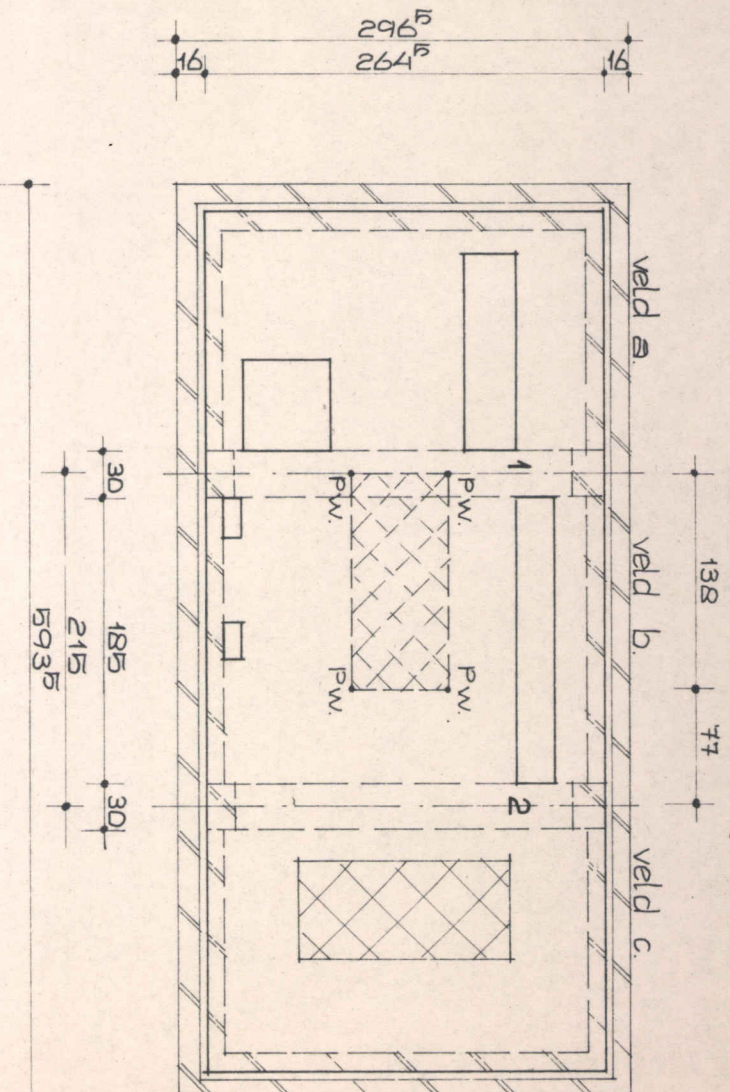
$$9.6 = 0.503 \sqrt{363}$$

$$A = 0.0784 \frac{363}{9.6} = 2.97 \text{ cm}^2$$

$$\underline{\underline{\text{neem } \phi 10-20 \text{ (393 cm}^2\text{)}}}$$

balken afmeting 30x37⁵ cm.

balk 1 is maatgevend.



$$x = 925 \cdot \frac{440}{1170} = 130 \text{ cm.}$$

$$\begin{aligned} \text{RA: } q &= \frac{2.475}{2} \times 1170 = 14150 \text{ kgf.} \\ P_1 &= 1 \times 1500 = 1500 \text{ kgf.} \\ P_2 &= \frac{0.30}{2.475} \times 600 = 73 \text{ kgf.} \end{aligned}$$

$$\underline{\underline{\text{belast} = 3023 \text{ kgf.}}}$$

$$\begin{aligned} \text{RB: } q &= \frac{2.475}{2} \times 1170 = 14150 \text{ kgf.} \\ P_1 &= 1 \times 1500 = 1500 \text{ kgf.} \\ P_2 &= \frac{2.175}{2.475} \times 600 = 527 \text{ kgf.} \end{aligned}$$

$$\underline{\underline{\text{belast} = 3477 \text{ kgf.}}}$$

$$\begin{aligned} P_s &= 4400 \text{ kgf.} \\ P_w &= \frac{4400}{4} = 1100 \text{ kgf.} \end{aligned}$$

belasting van brandstofsbor
op balk = P₁.

$$\begin{aligned} P_1 &= P_w + \frac{77}{215} P_w = \frac{292}{215} P_w = 1500 \text{ kgf} \\ P_2 &= \text{bel. v. codkast} \frac{1200}{2} = 600 \text{ kgf.} \end{aligned}$$

$$\begin{aligned} \text{bel. v. vloer} &= \left(\frac{1.85 + 1.50}{2} + 0.30 \right) 500 = 990 \text{ kgf/m} \\ \text{eigen gew.} &= 0.30 \times 0.25 \times 2400 = 180 \text{ kgf/m} \end{aligned}$$

$$\underline{\underline{q = 1170 \text{ kgf/m}}}$$

$$m_{\max} = 3023 \times 1.30 - \left(\frac{1.30}{2}\right)^2 \times 1170 - 0.375 \times 1500 = \underline{\underline{2380 \text{ kgfm.}}}$$

$$h = 37^5 - 2 \cdot 1 \cdot 0^4 = 33.8 \text{ cm.}$$

$$h = 33.8 = 0.379 \sqrt{\frac{2380}{0.30}}$$

$$A = 0.0815 \frac{2380}{33.8} = 5.75 \text{ cm}^2$$

$$\underline{\underline{\text{neem } 4 \phi 14 \quad (6.16 \text{ cm}^2)}}$$

$$m_i = \frac{2380}{3} = 794 \text{ kgm.}$$

$$h = 37^5 - 4 \cdot 1 \cdot 0^4 = 31.8$$

$$h = 31.8 = 0.612 \sqrt{\frac{794}{0.30}}$$

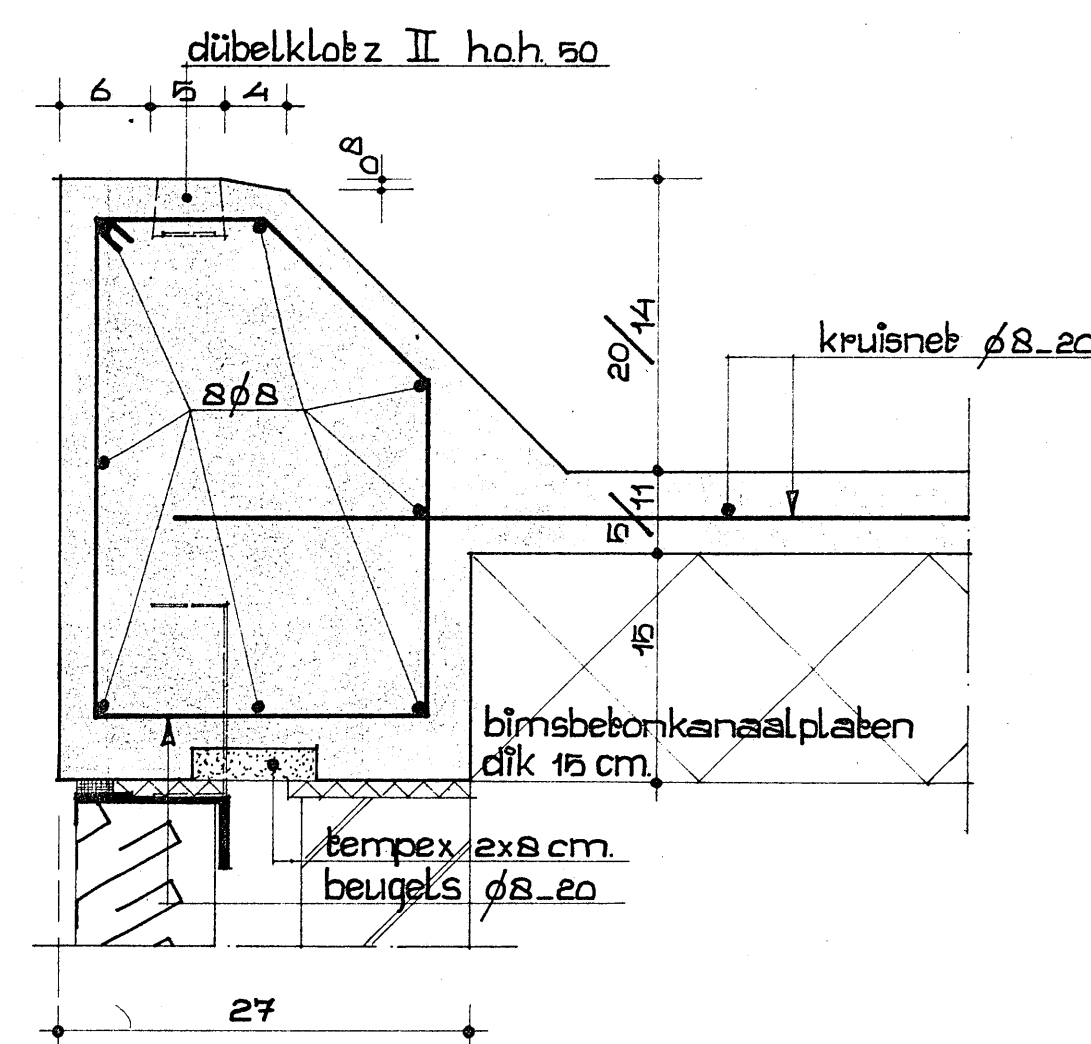
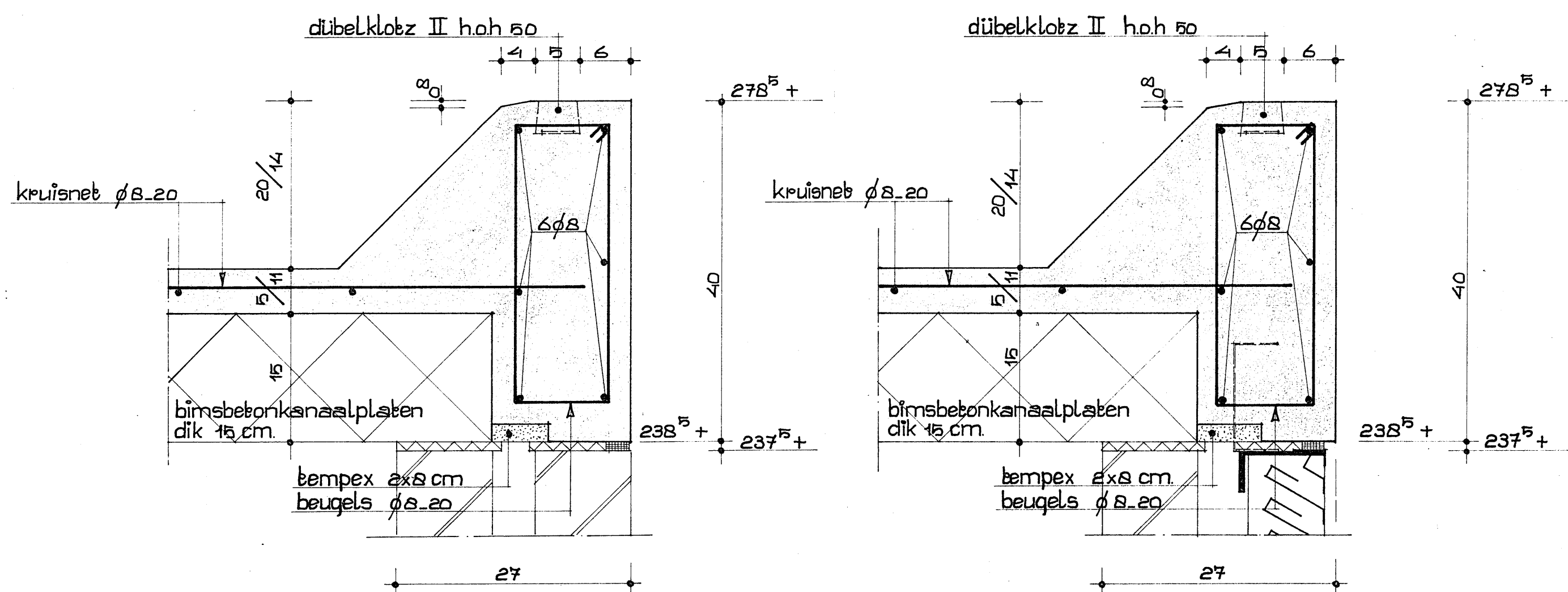
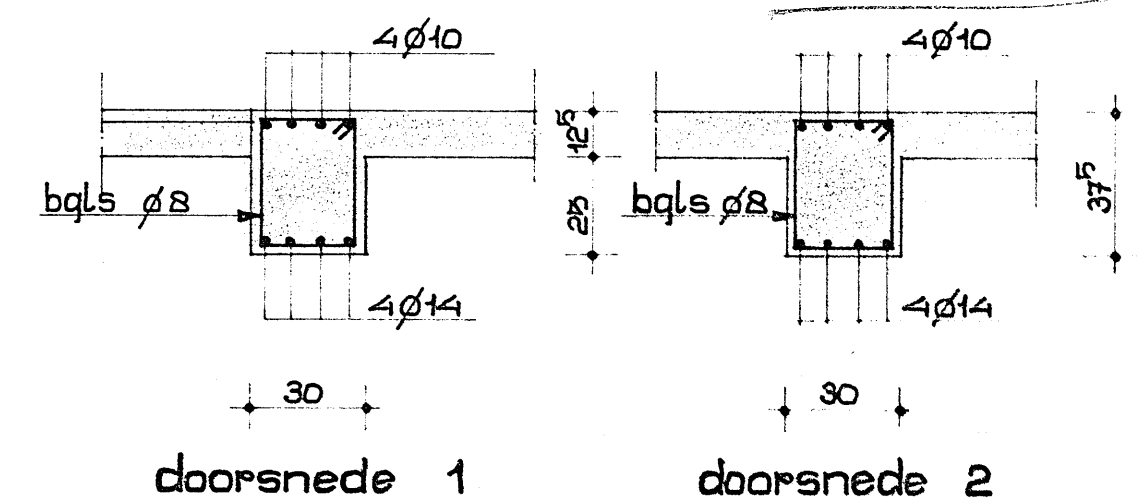
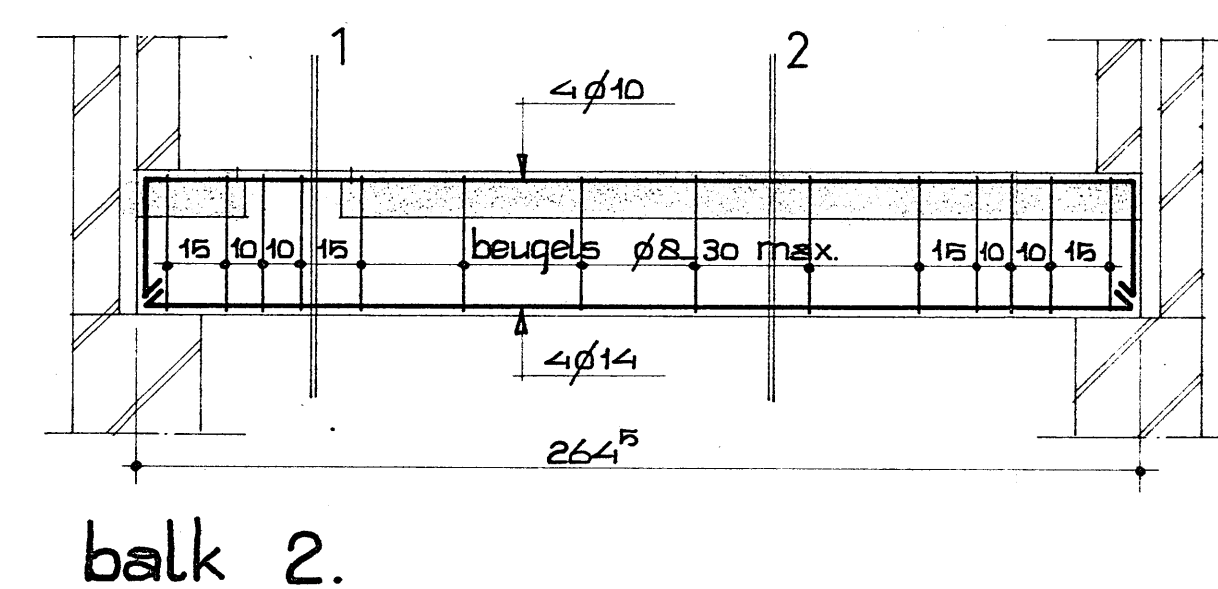
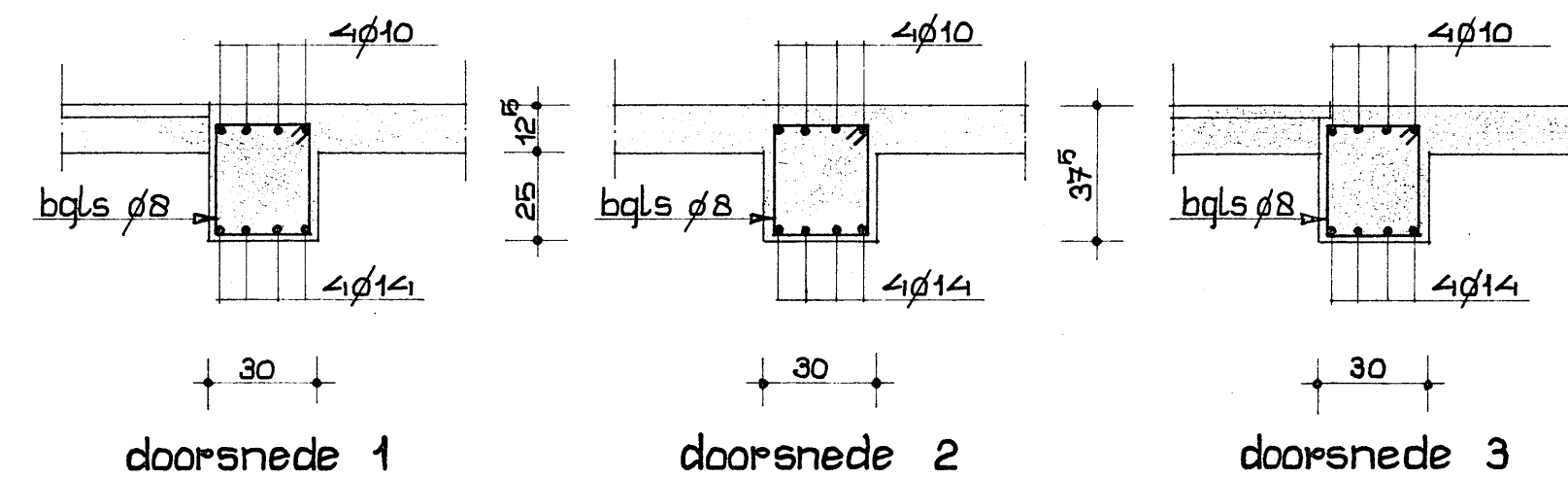
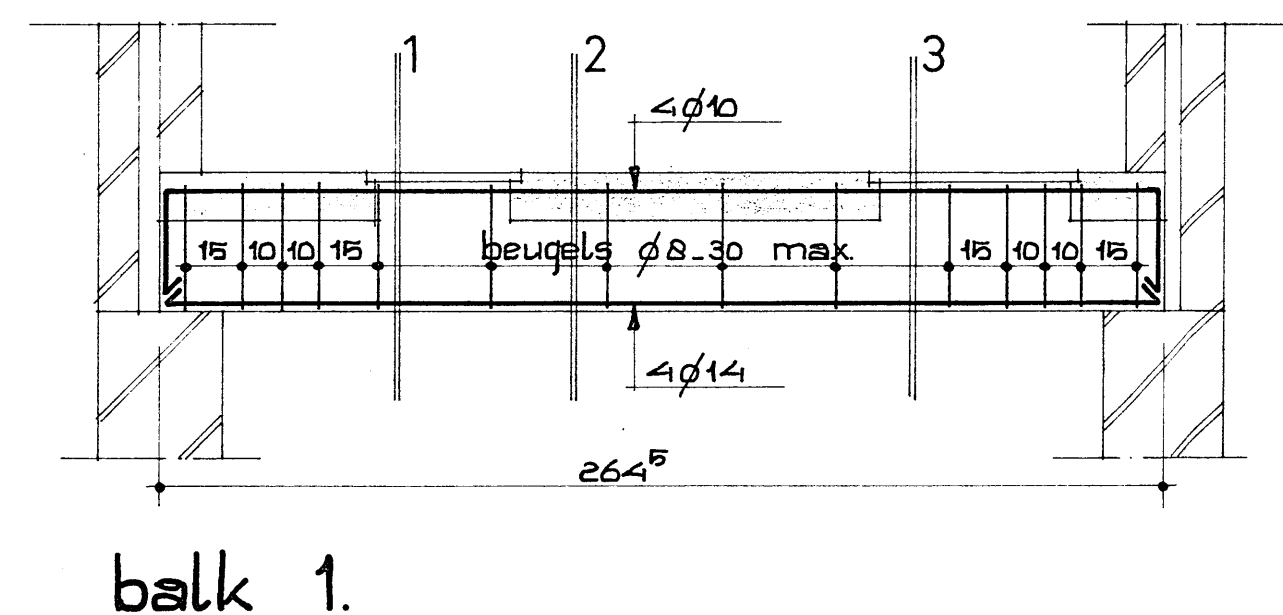
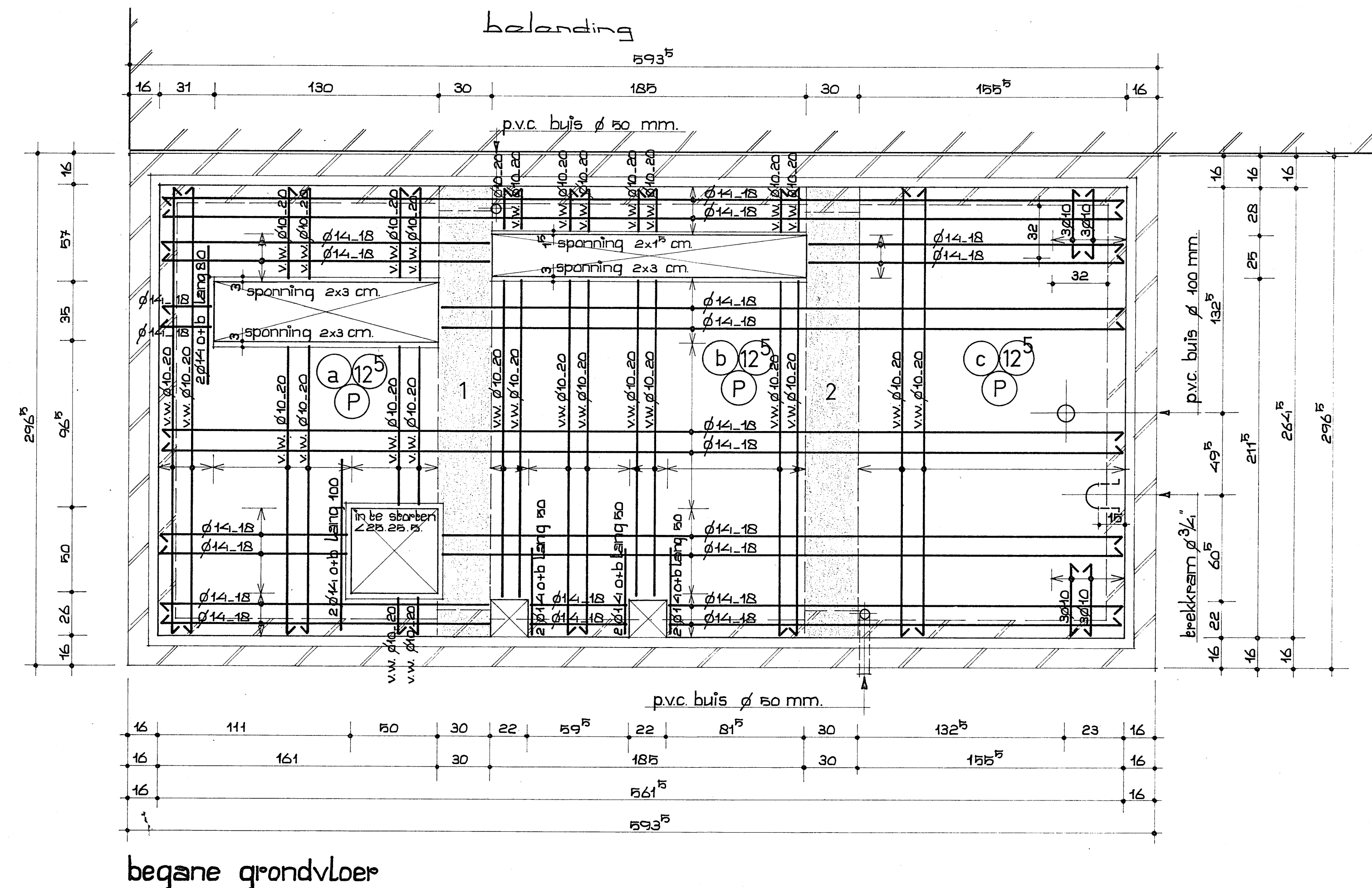
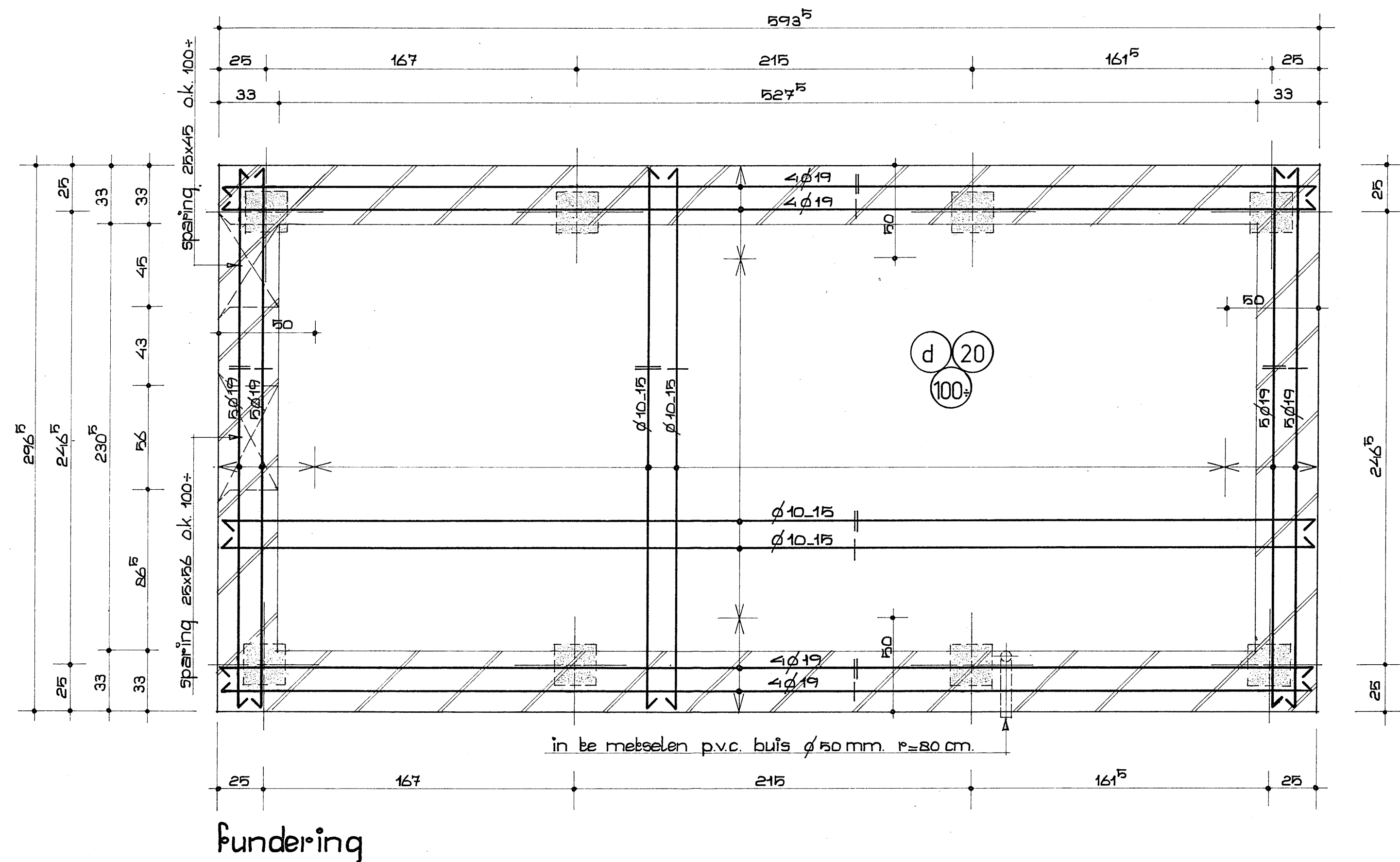
$$A = 0.0772 \times \frac{794}{31.8} = 1.93 \text{ cm}^2$$

$$A_{\min} = 0.25\% \times 30 \times 37^5 = 2.81 \text{ cm}^2$$

$$\underline{\underline{\text{neem } 4 \phi 10 \quad (3.14 \text{ cm}^2)}}$$

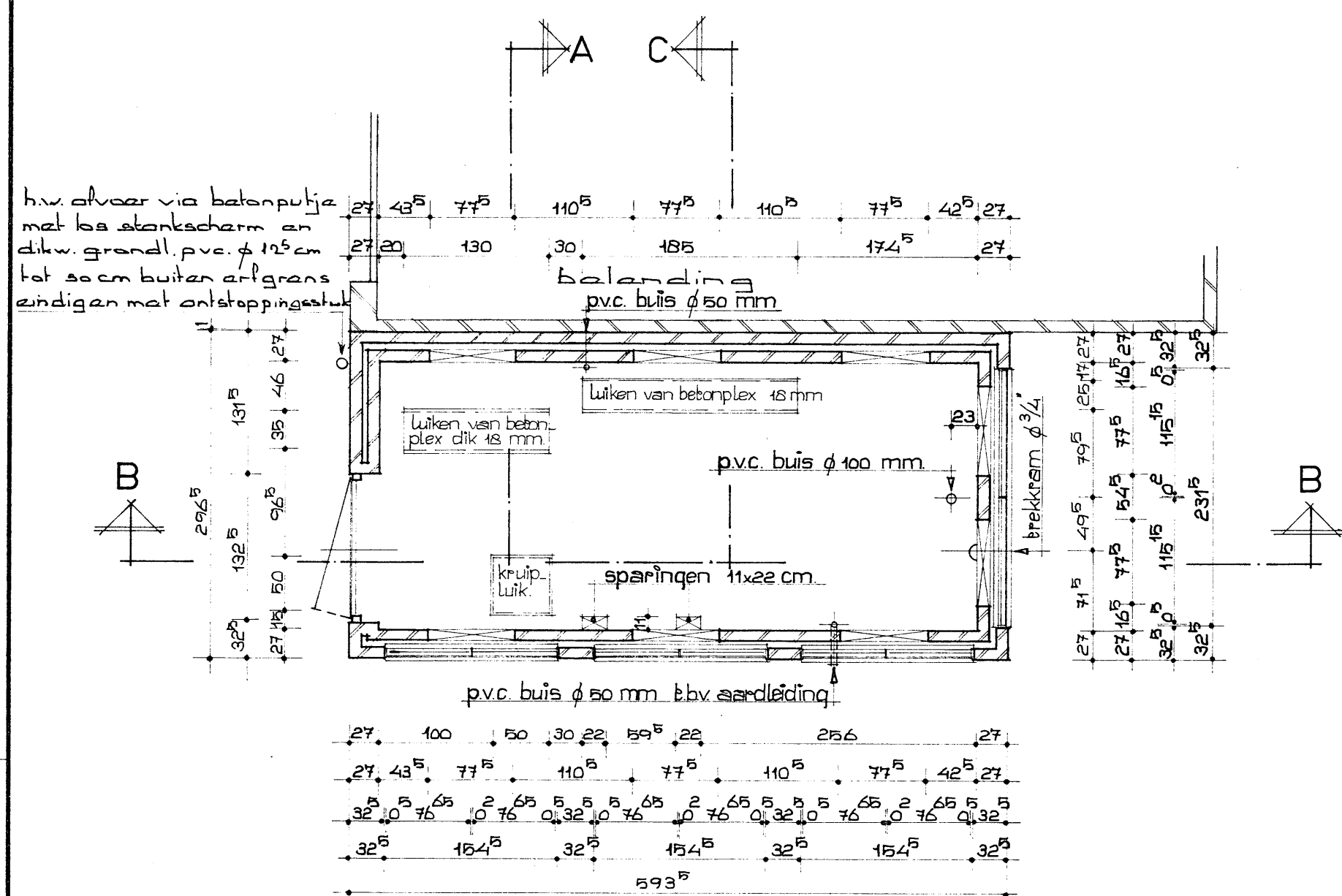
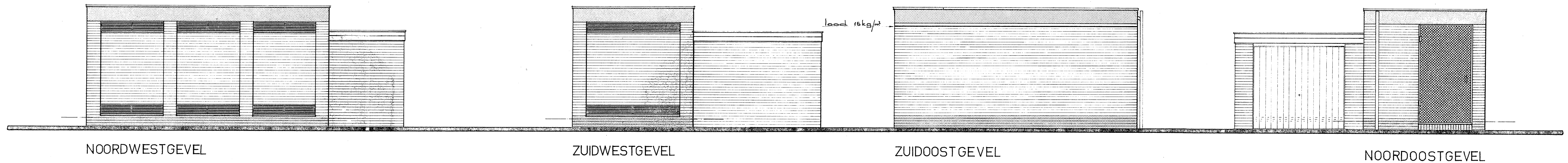
$$T_m = 3477 \text{ kgf}$$

$$G_b = \frac{1.5 \times 3477}{30 \times 37^5} = 4.64 \text{ kgf/cm}^2 < 6 \text{ kgf/cm}^2$$



zie voor dakranddetail
ook div. tek. 2376 bld. 8.

g.b.v. 1962 staal ø 24. k 160 cement 325 kg/m ³			
betondekking op buitenste staaf of beugel.			
	onderzijde	bovenzijde	zijkant
funderingsplaat:	2	1 ⁵	2
begane grondvloer:	1	2	2
balken in begane grondvloer:	2	2	2
dakrand:	2 ⁵	2 ⁵	2 ⁵
betonsamenstelling:			
werkvloer B2 overig betonwerk B4.			
Getekend	doc. 11	Schaal	Opmerkingen
Gezien		1:20	MATEN IN CM
Gewijzigd		1:5	G. 1000 OP PALLI
TRANSFORMATORSTATION „Abbenven“			2976
IN DE GEMEENTE. HEEMSKERK			
BETONTEKENING.			
PROVINCIAAL ELECTRICITEITSBEDRIJF			
VAN NOORD-HOLLAND			
CIVIELTECHNISCHE EN BOUWKUNDIGE ZAKEN			
9 Bladen			Blad 2



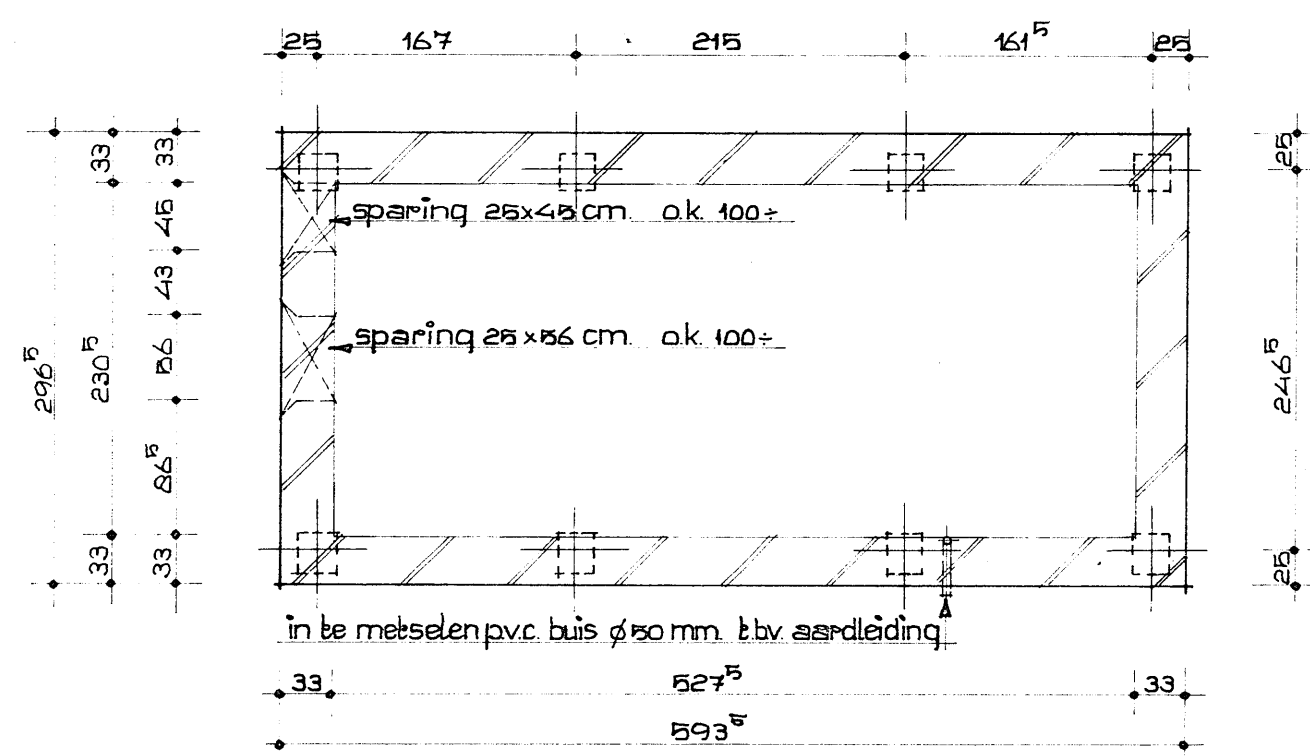
PLATTEGROND

verklaring:

- metselwerk.
- cementraam.
- gewapend beton.
- stampbeton.
- bimsbetonkanalplaten.
- tempex.

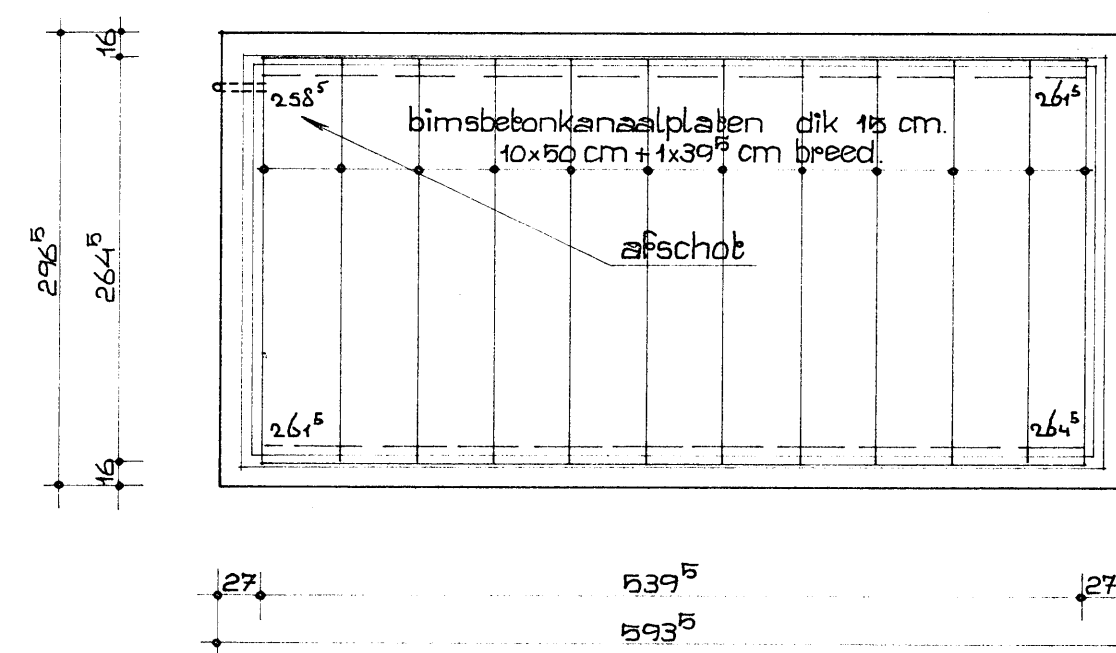
funderingsmetselwerk
gevel m.w. cementraam
gevel m.w. opgaand
overig m.w. cementraam
opgaand metselwerk

kalkezzandsteen
mangassteen
kleur: paarsbruin
klinkers
hardgrauw } miskleurig



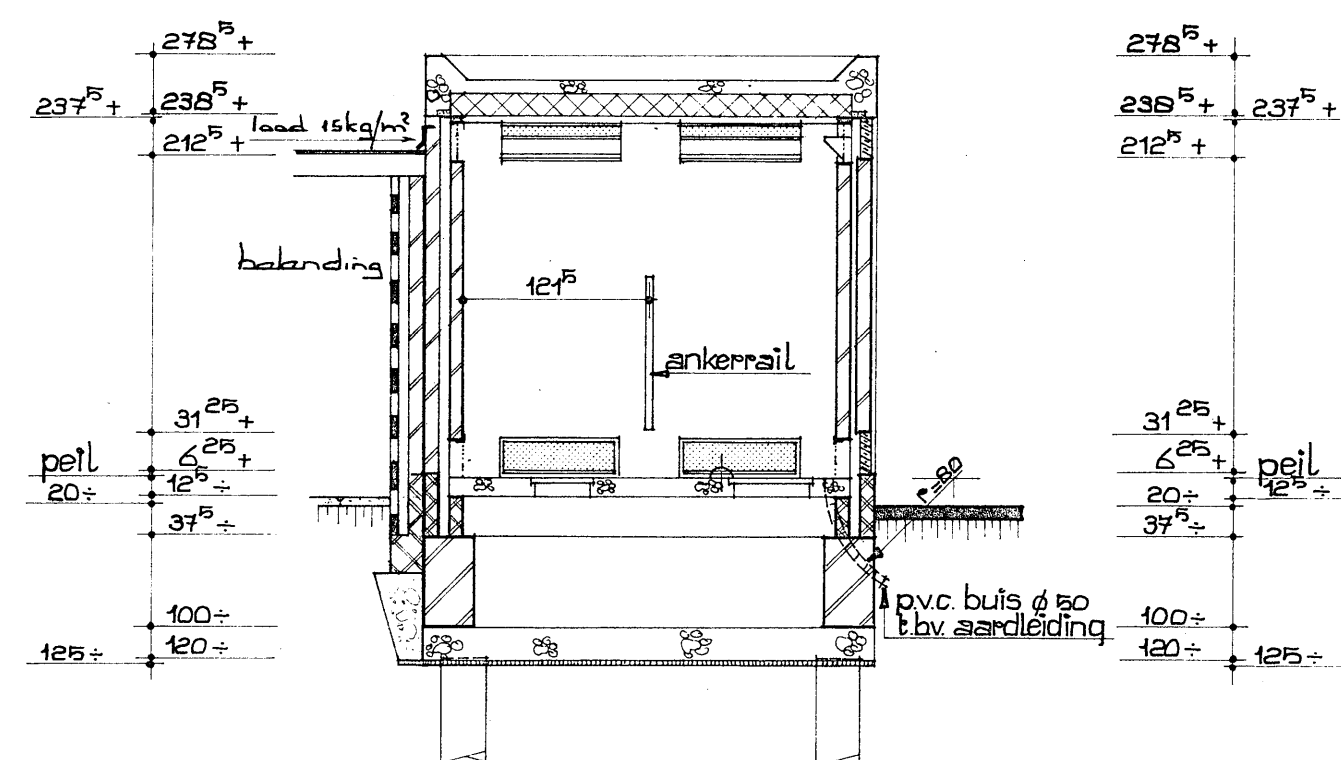
FUNDERING

8 stuks betonpalen lang 4,50 m. ϕ 22 cm
na het heien de betonpalen tot 15 cm boven de onderkant van de funderingsplaat afsnijden.

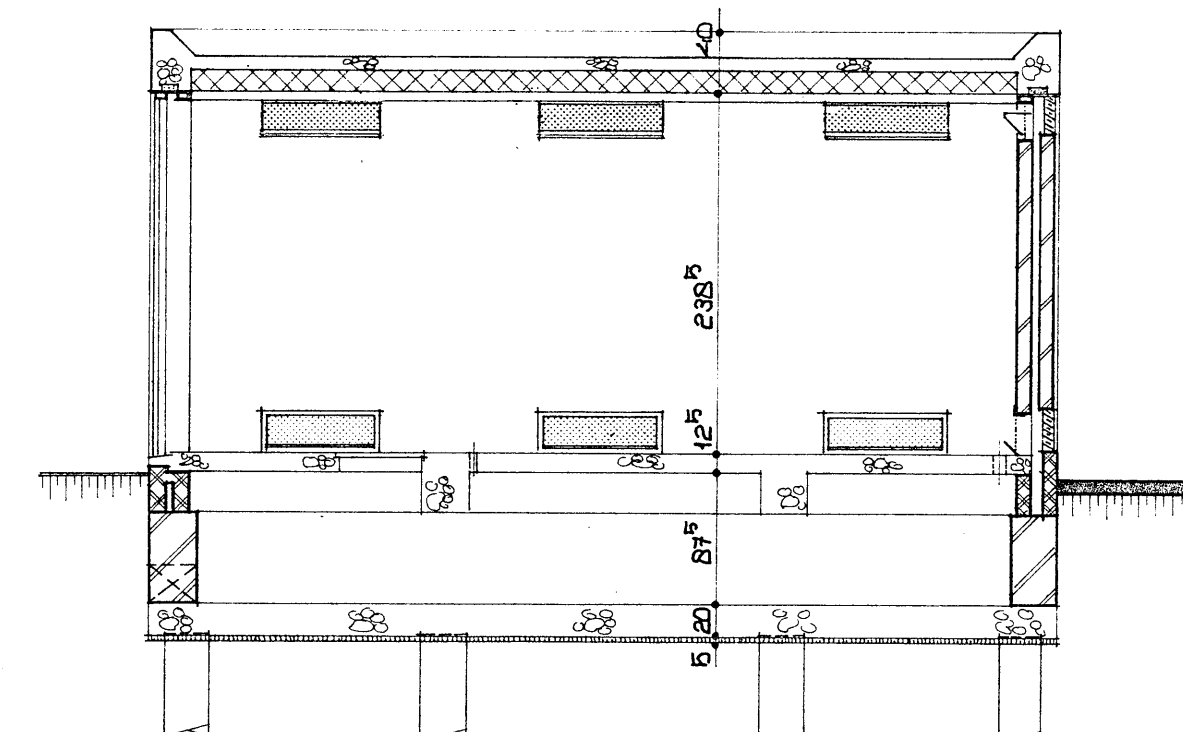


DAKPLAAT

h.w. afvoer gebroken buis inw. ϕ 75 mm
thermisch verzinkt.



DOORSNEDE A-A

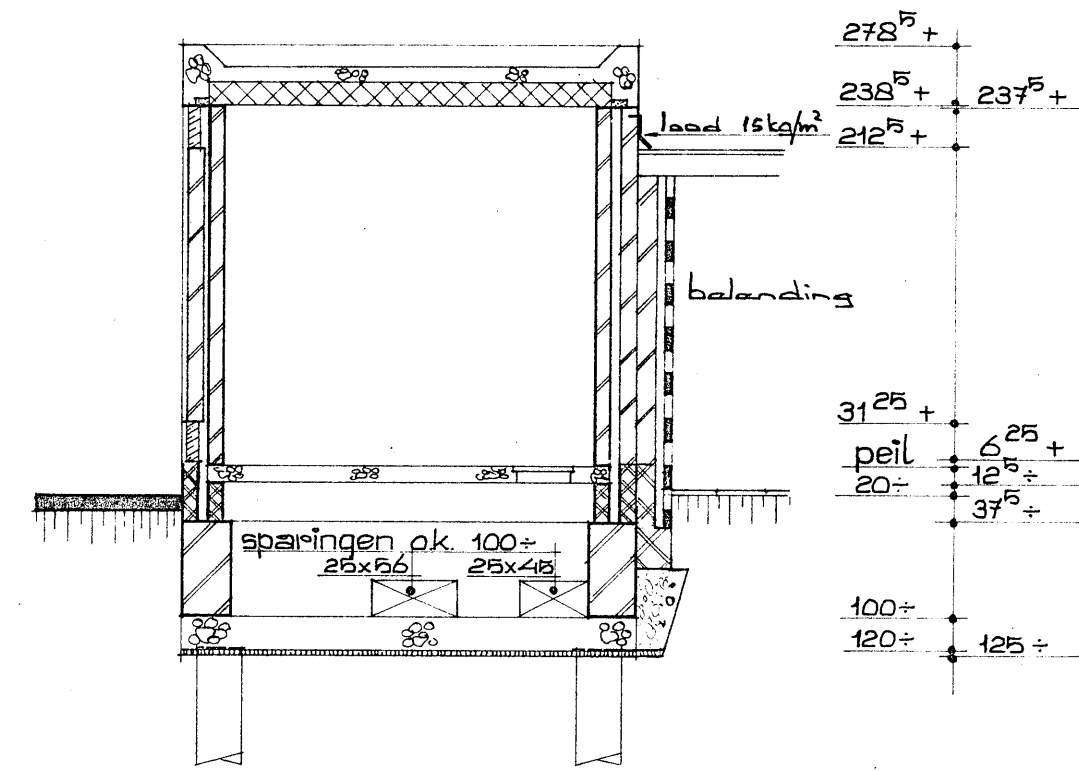


DOORSNEDE B-B

schakelkalk
p.c.
zand
1 1/2 3
1 1/4 2 1/4
1 1/4 3
1 1/4 2 1/4
1 1/4 3

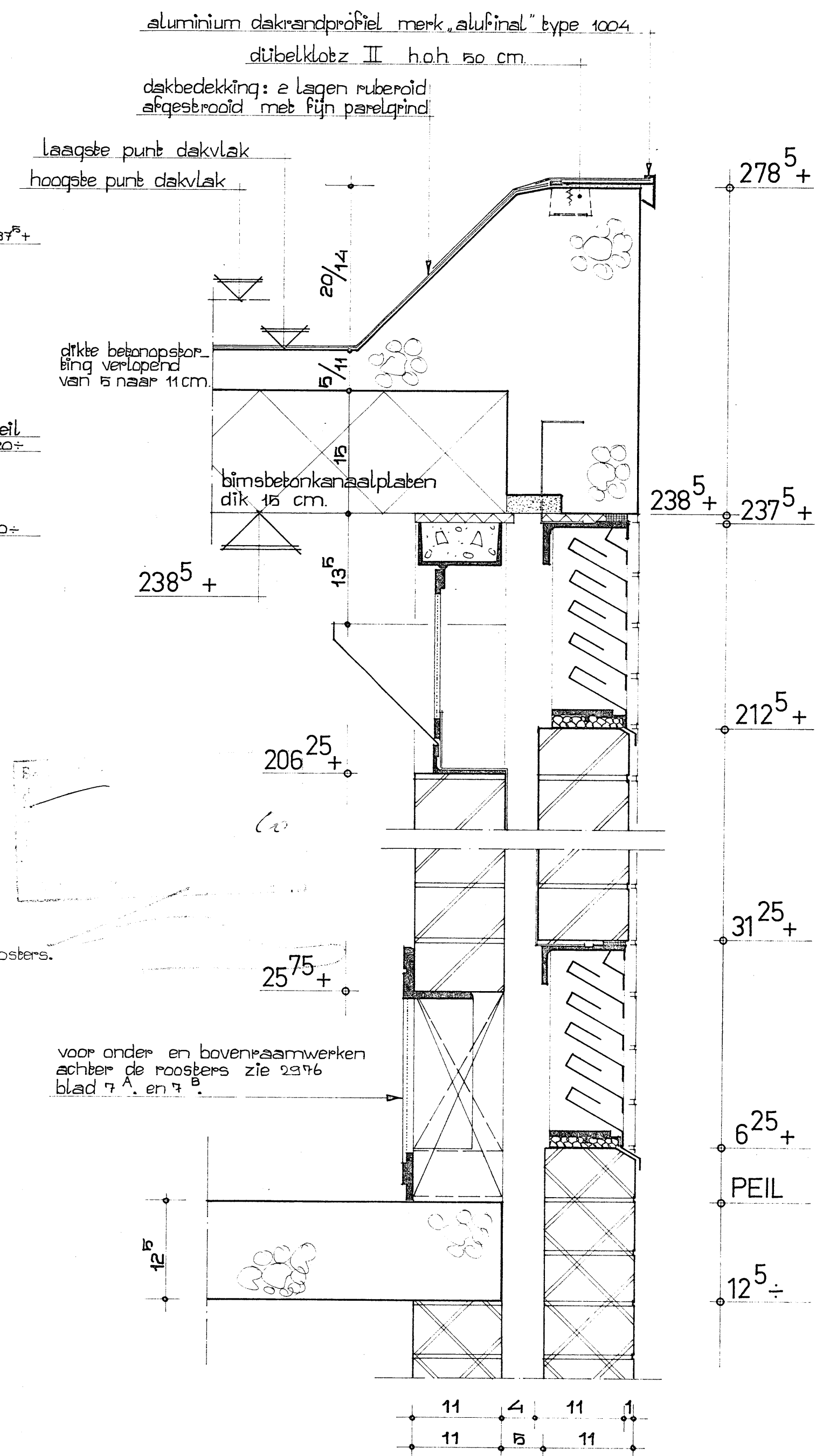
bijbehorende tekeningen:

- div. silt. 2.345 bouwsituatie.
- 2.376 blad 2. betonbepaling.
- " " 3 stalen deurkozijn met deur.
- " " 4 overzicht ventilatieroosters.
- " " 5 details onderste ventilatieroosters.
- " " 6 details bovenste ventilatieroosters.
- " " 7.1+7.2 staalwerk achter boven- en onderroosters.
- " " 8 algemene details.
- " " 9 dakrand detail.



DOORSNEDE C-C

schakelwerk : kleurno's gelijkens.
kozijn : zwart.
deur : 8862.
roosters : zwart.
dakrand : d. 55.



Getekend	daa. '71	Schaal	Opmerkingen
Gezien		1:50	MATEN IN CM
Gewijzigd		1:5	G. 1000 OP PALEN

TRANSFORMATORSTATION, Abbenven"
IN DE GEMEENTE: HEEMSKERK
BESTEKTEKENING

PROVINCIAAL ELECTRICITEITSBEDRIJF VAN NOORD-HOLLAND	2976
CIVIELTECHNISCHE EN BOUWKUNDIGE ZAKEN	9 Bladen Blad 1

30 DEC 1971

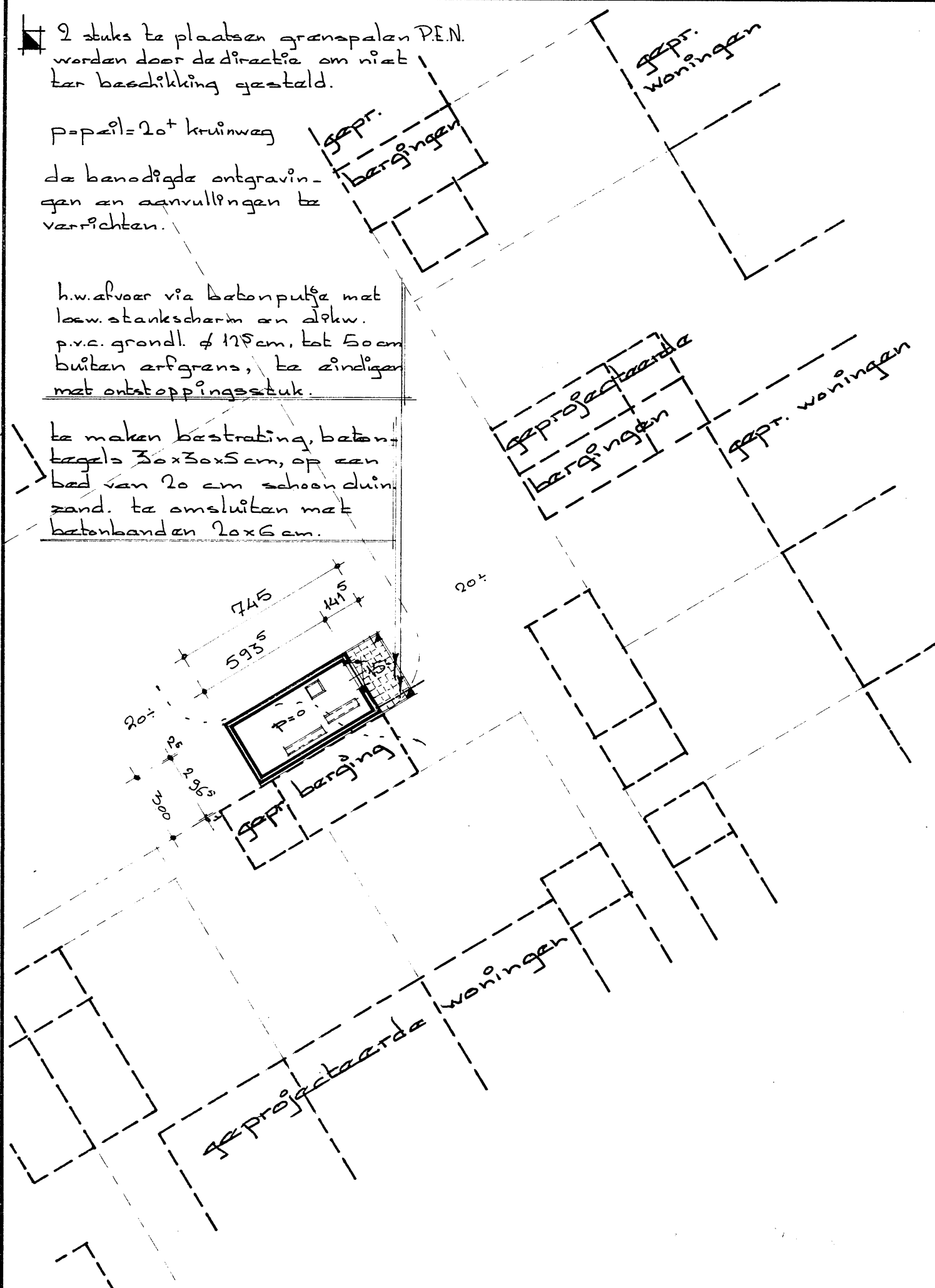
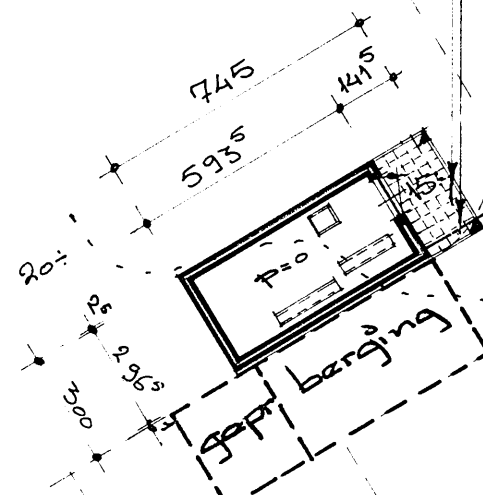
- 2 stuks te plaatsen grenspalen P.E.N. worden door de directie om niet ter beschikking gesteld.

p-p=1=20+ kruinweg

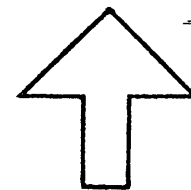
de benodigde ontgravingen en aanvullingen te verrichten.

h.w.afvoer via betonputje met lozw.stankescherin en afkw. p.v.c. grondl. ϕ 125cm, tot 50cm buiten erfgrans, te eindigen met onstopingsstuk.

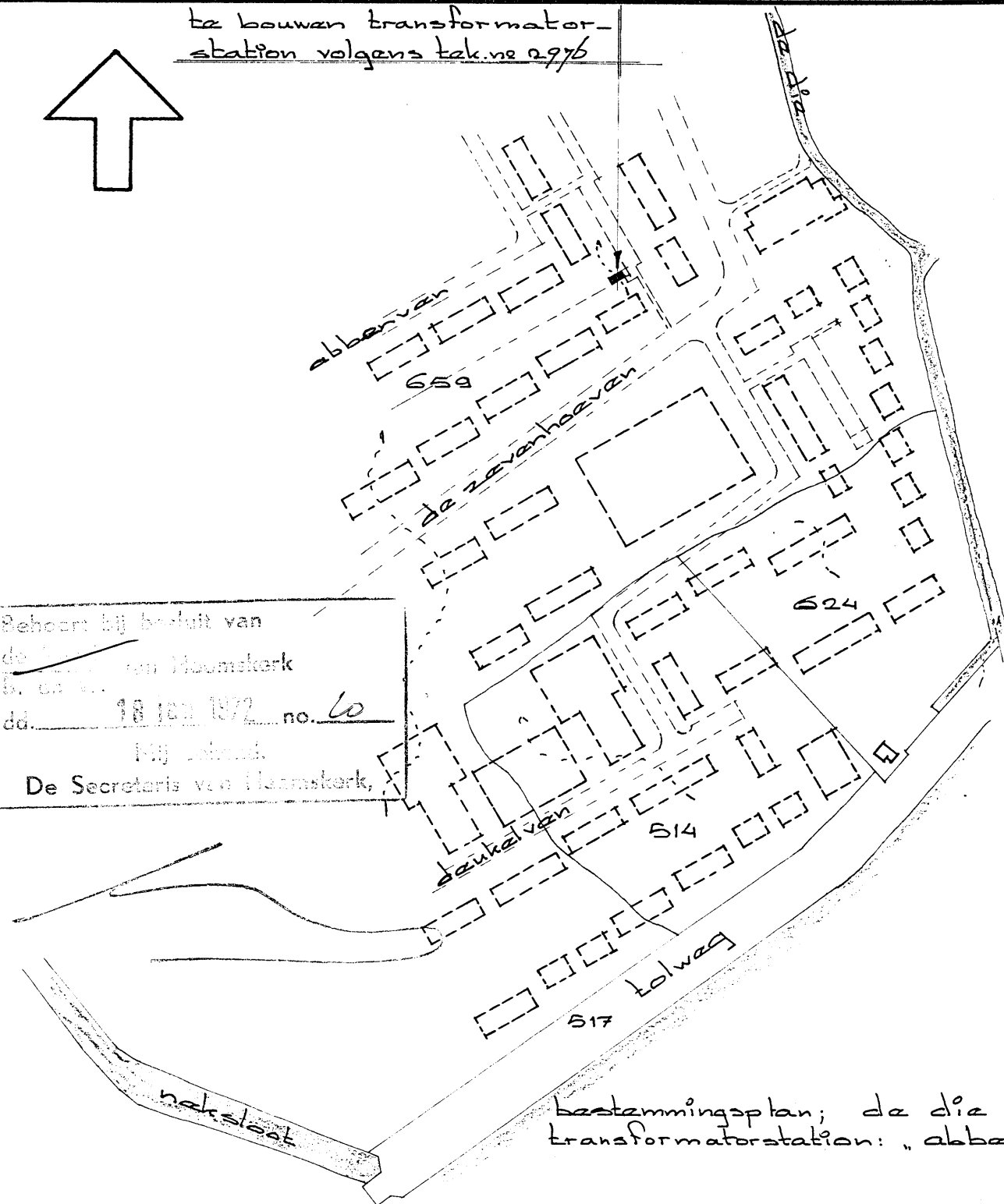
te maken bestrating, beton tegels 30x30x5cm, op een bed van 20 cm schoen duin zand. te omsluiten met betonbanden 20x6cm.



te bouwen transformatorstation volgens tek.nr 2976



Behoort bij besluit van
de Commissie van Maatschappij
B. en V.
dd. 18 juli 1971 no. 60
Mij bekend.
De Secretaris van Maatschappij



bestemmingsplan; de die vdp.nr 2 transformatorstation: „abbervan.“

Getekend L.v.	juli 1971	Schaal 1:2500 1:200	Opmerkingen maten in cm.	
Gezien				
Gewijzigd				
Situatie in de gemeente HEEMSKERK Kad. sectie B . no. 659 ged.				
PROVINCIAAL ELECTRICITEITSBEDRIJF VAN NOORD-HOLLAND CIVIELTECHNISCHE- EN BOUWKUNDIGE ZAKEN			DIV. SIT. 2945.	
			Bladen	Blad

30 JUL 1971