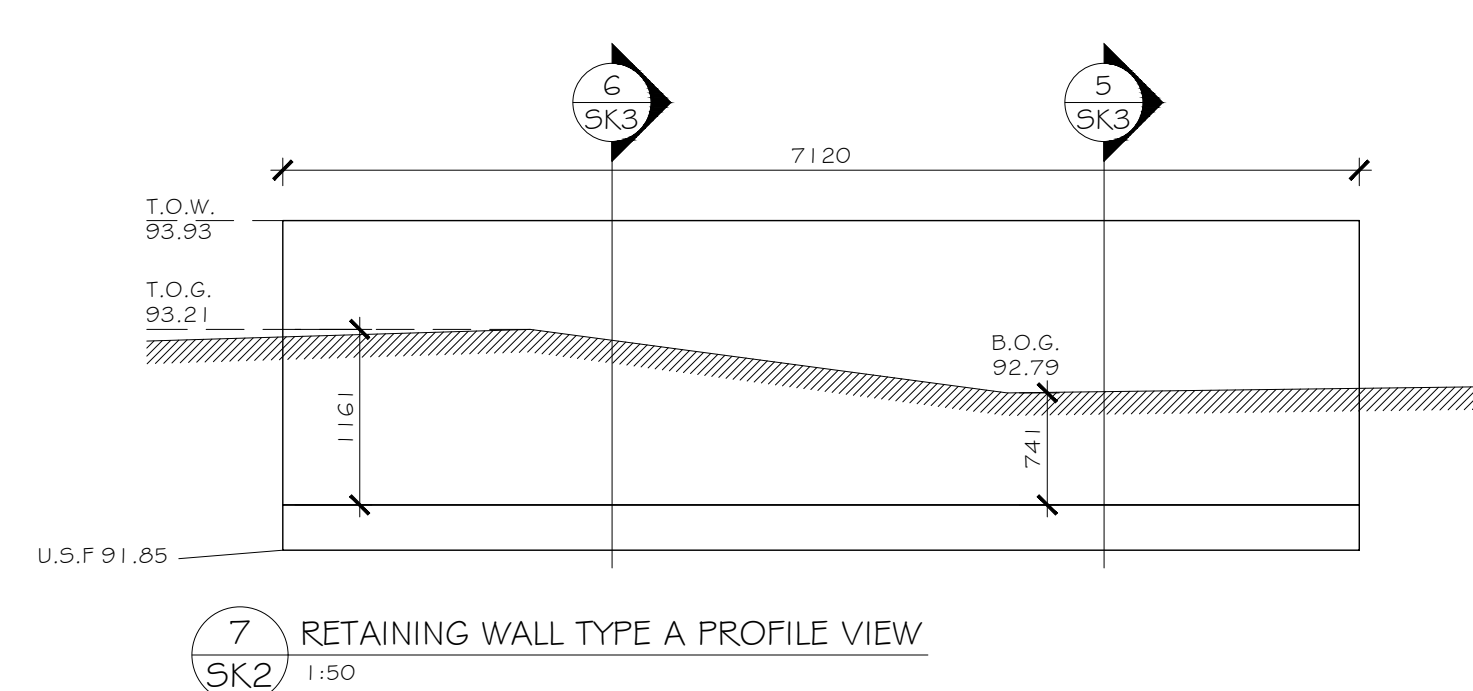
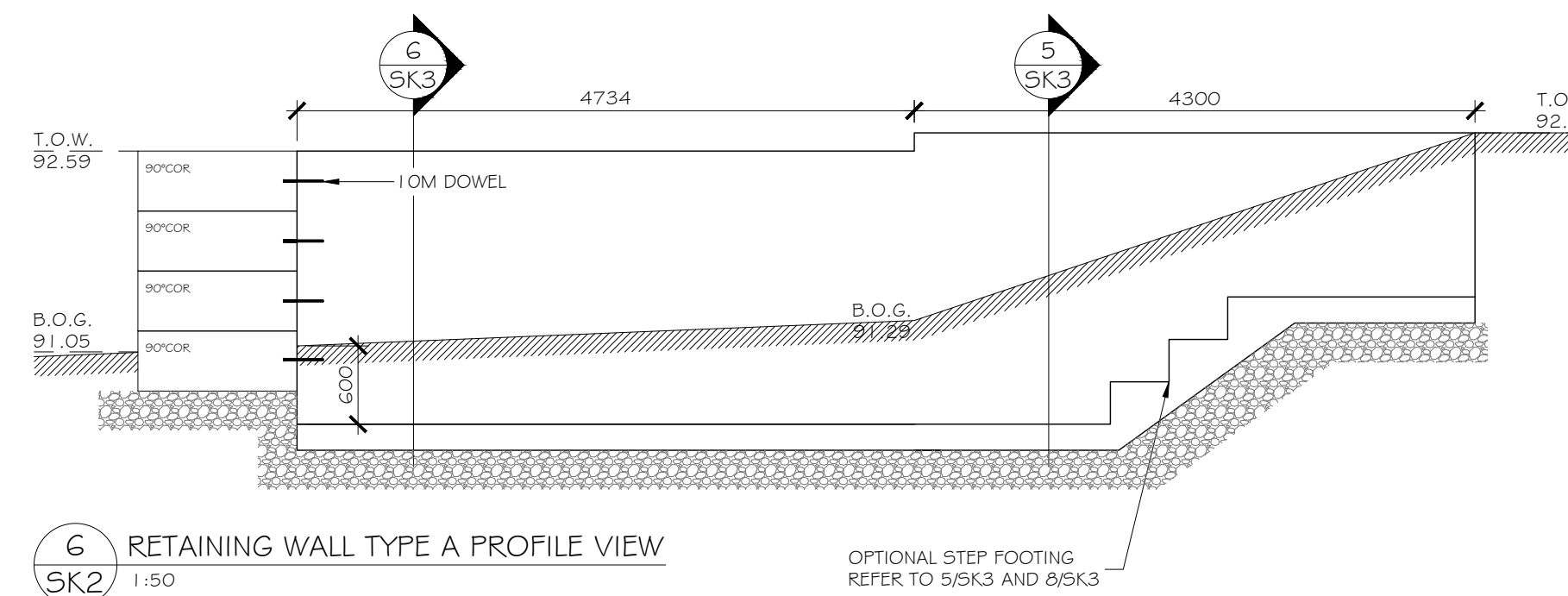
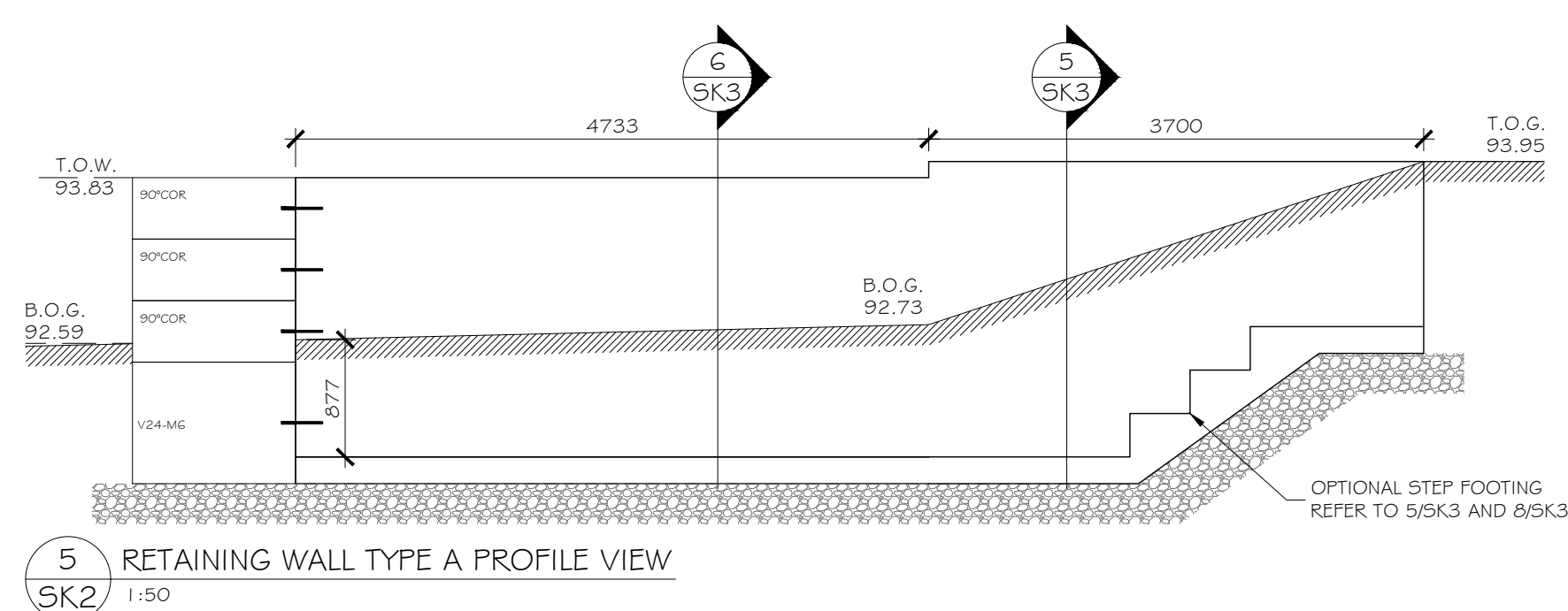
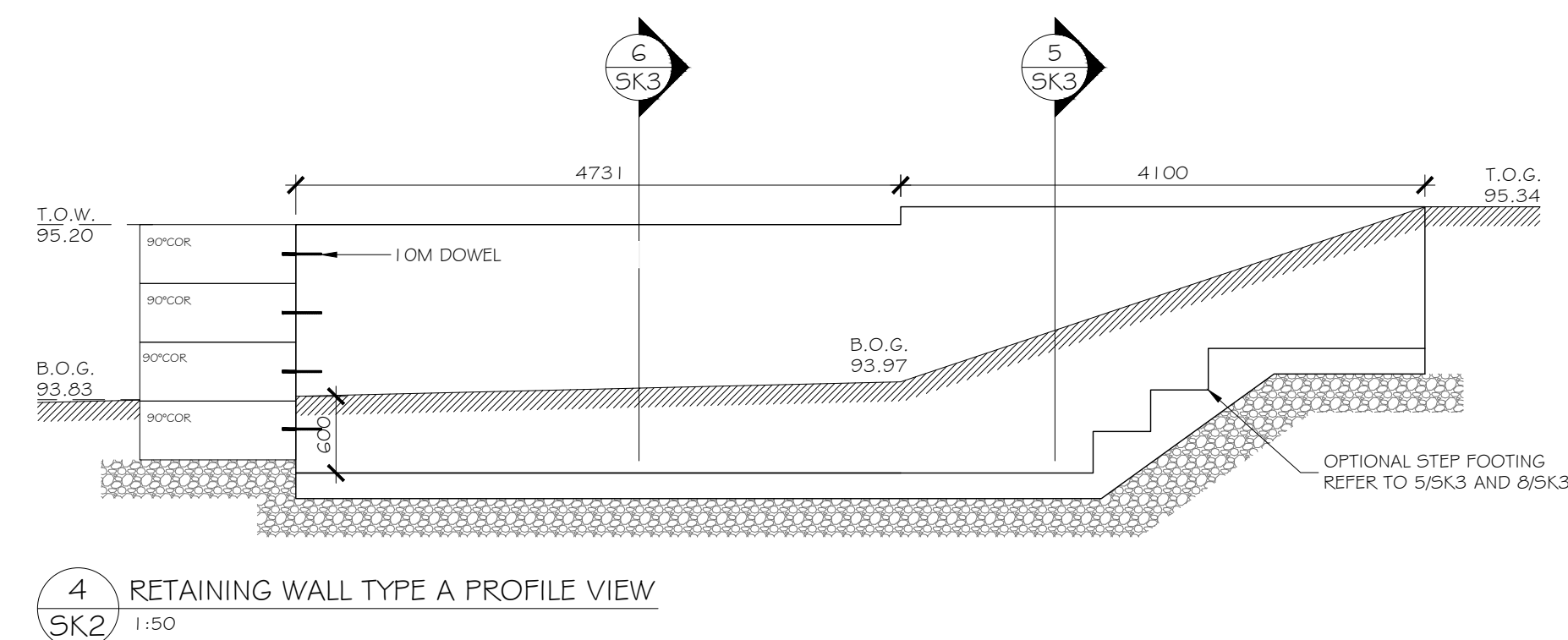
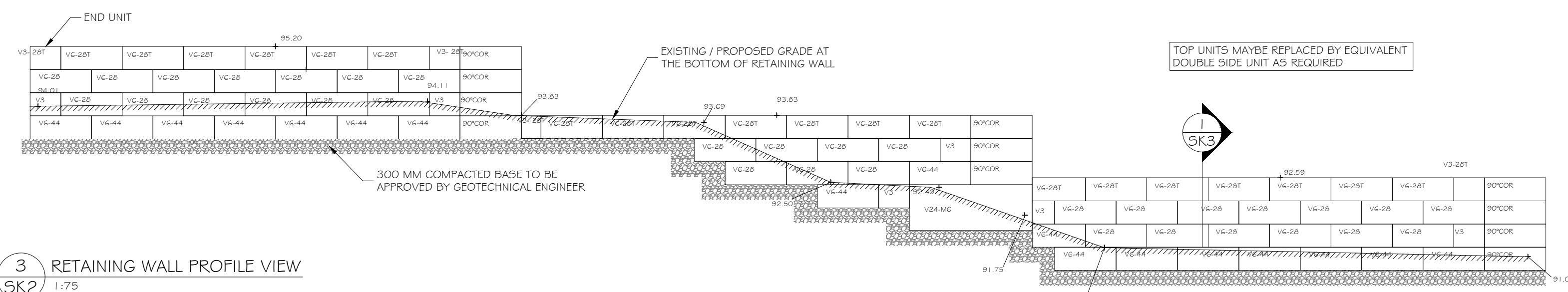
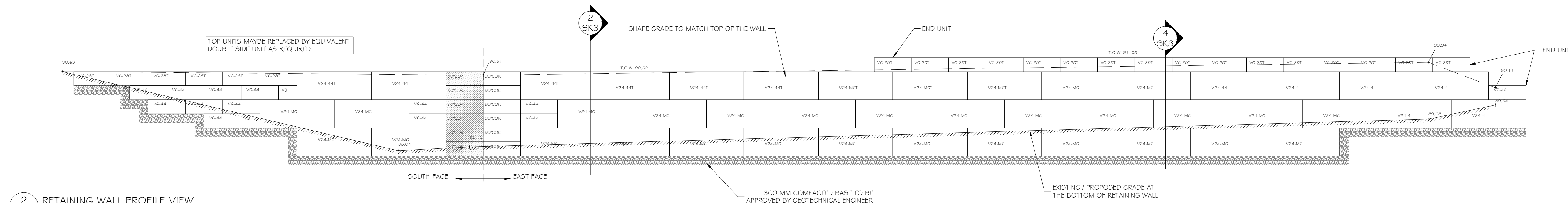
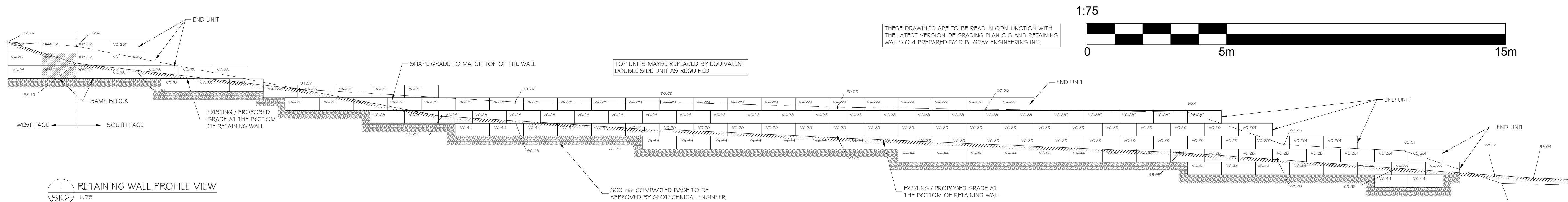
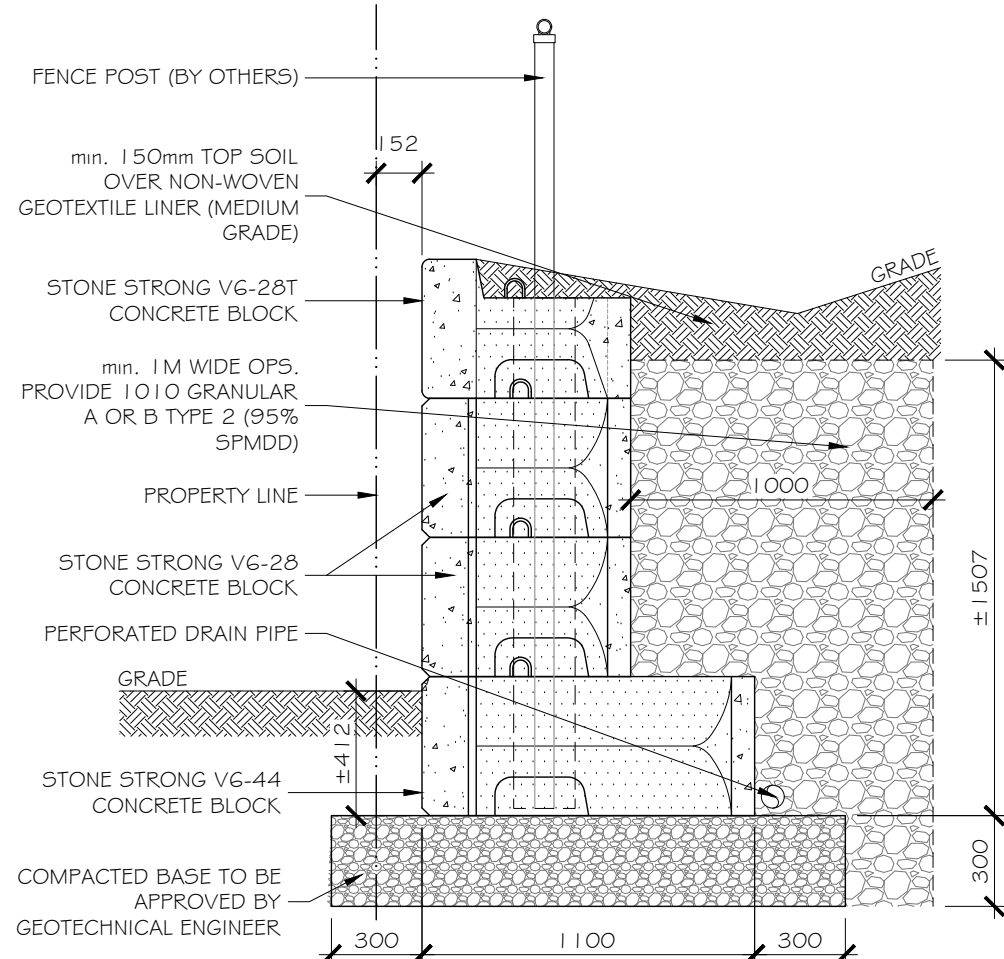
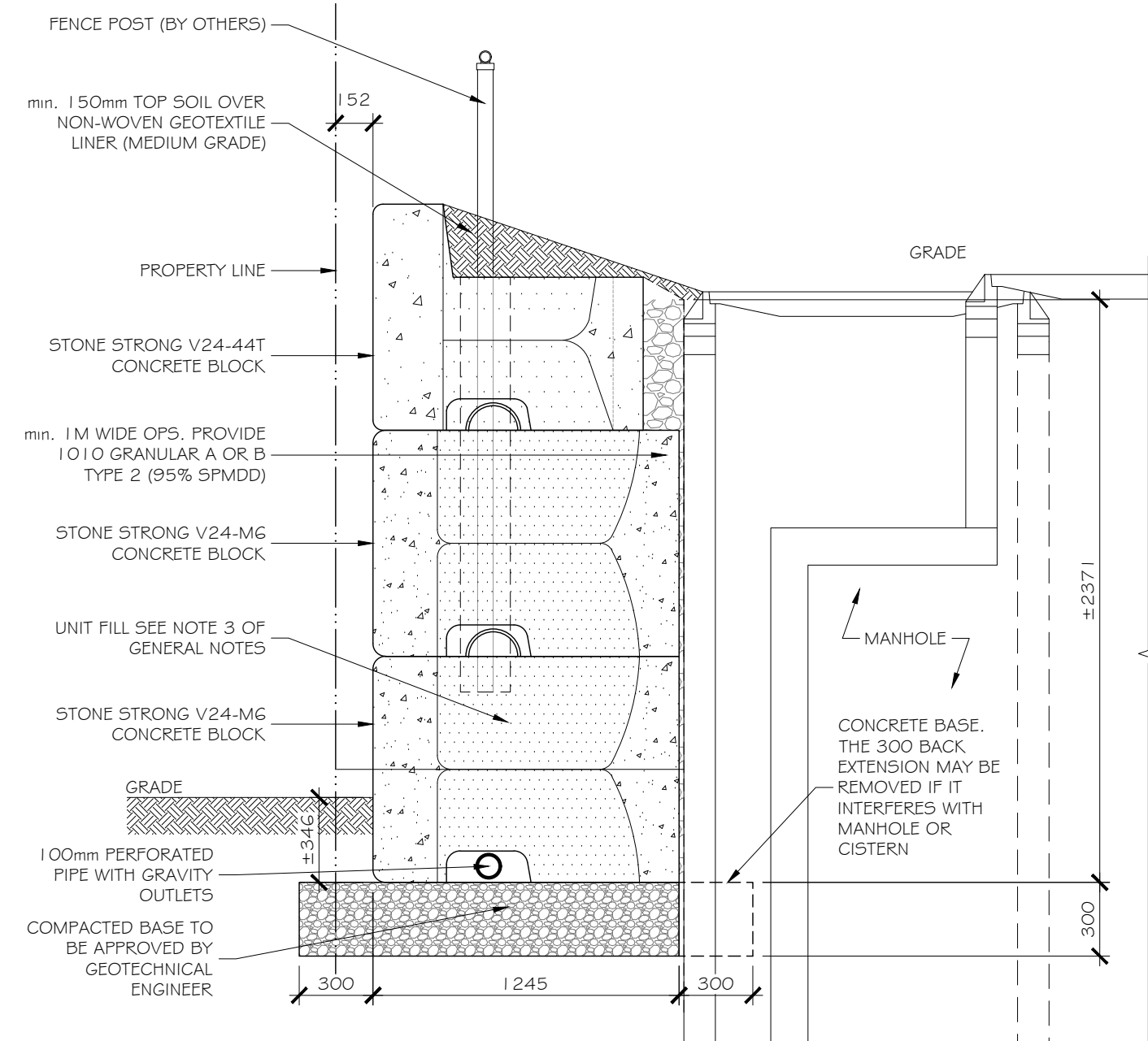
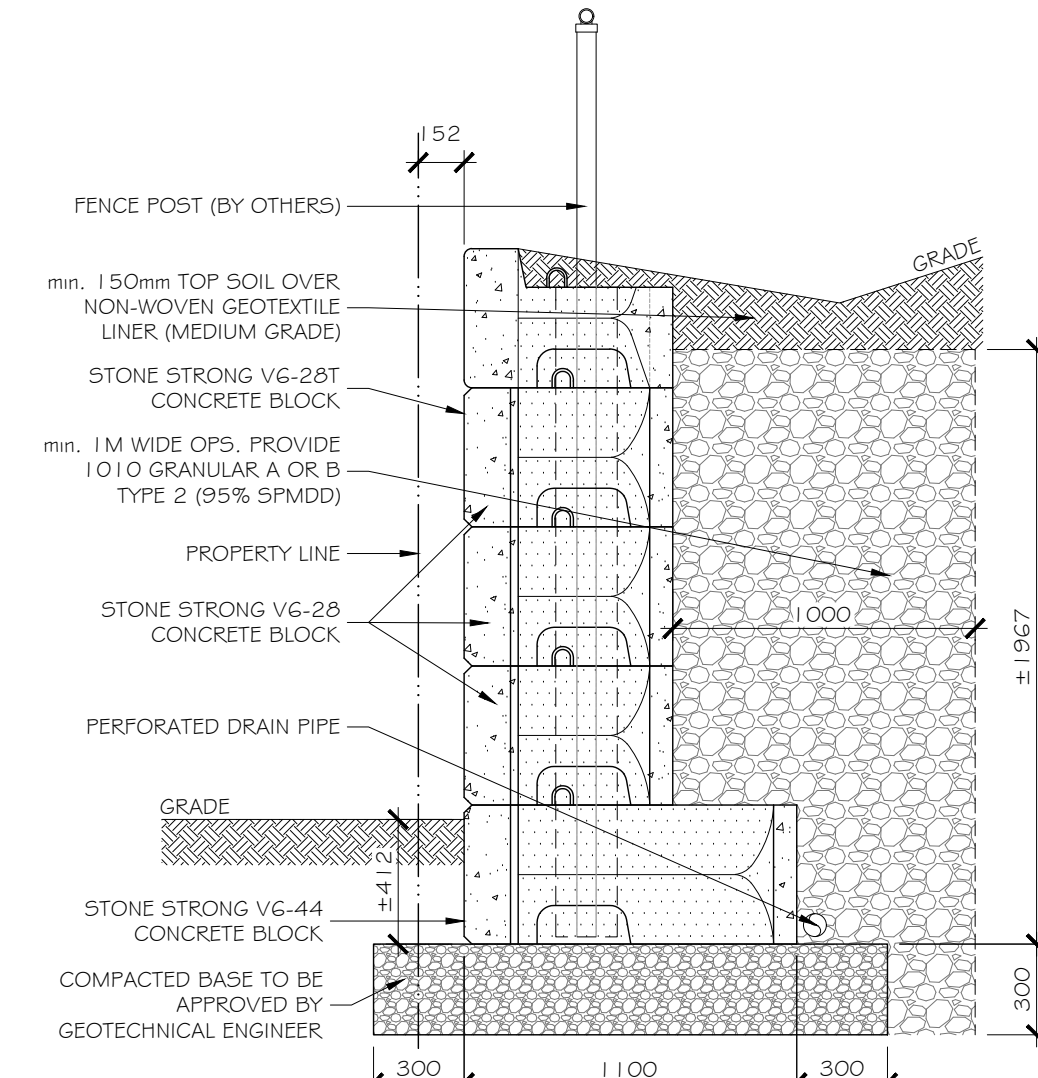
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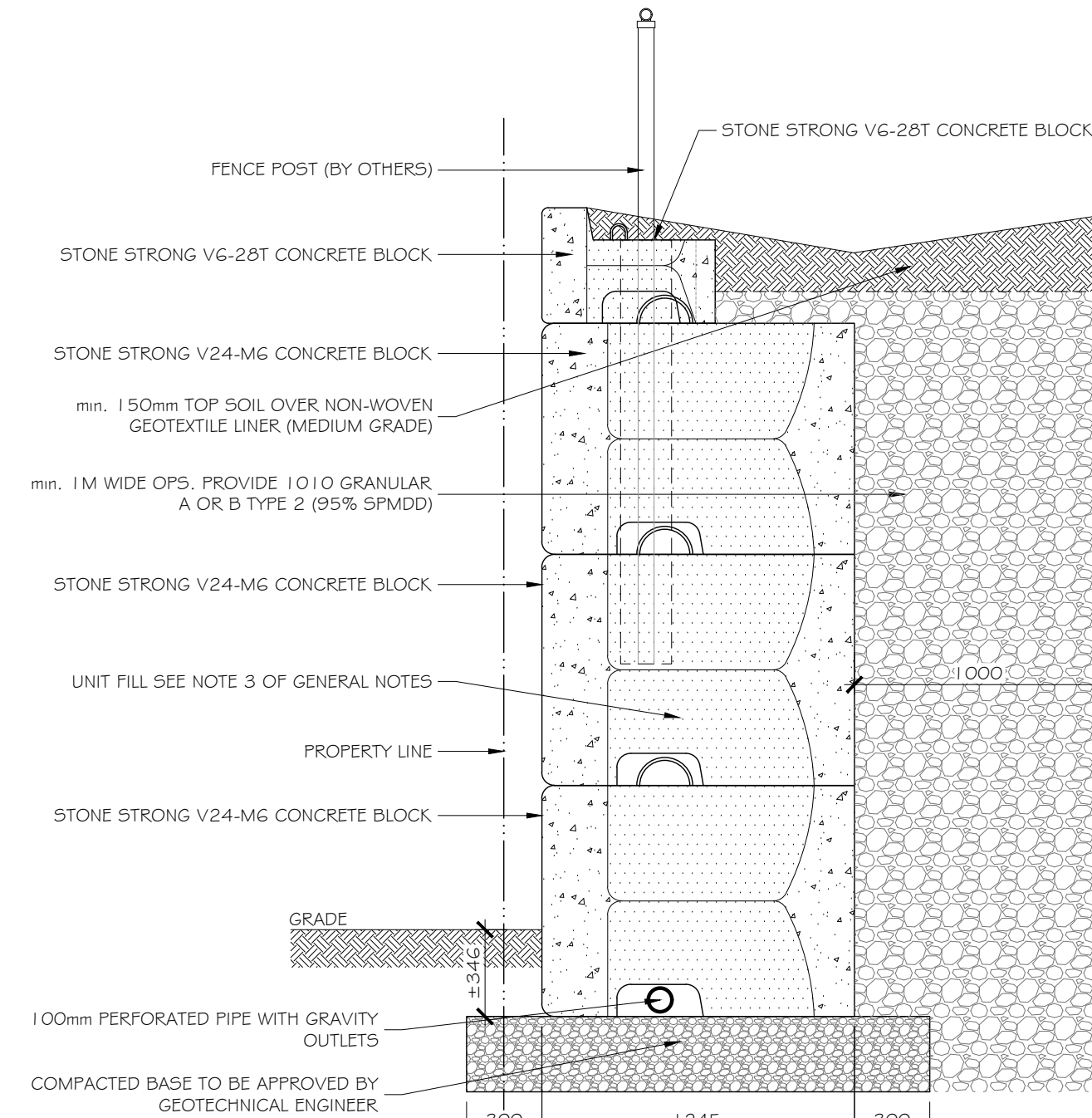
1 SK3 1:25 STONE STRONG RETAINING WALL CROSS SECTION



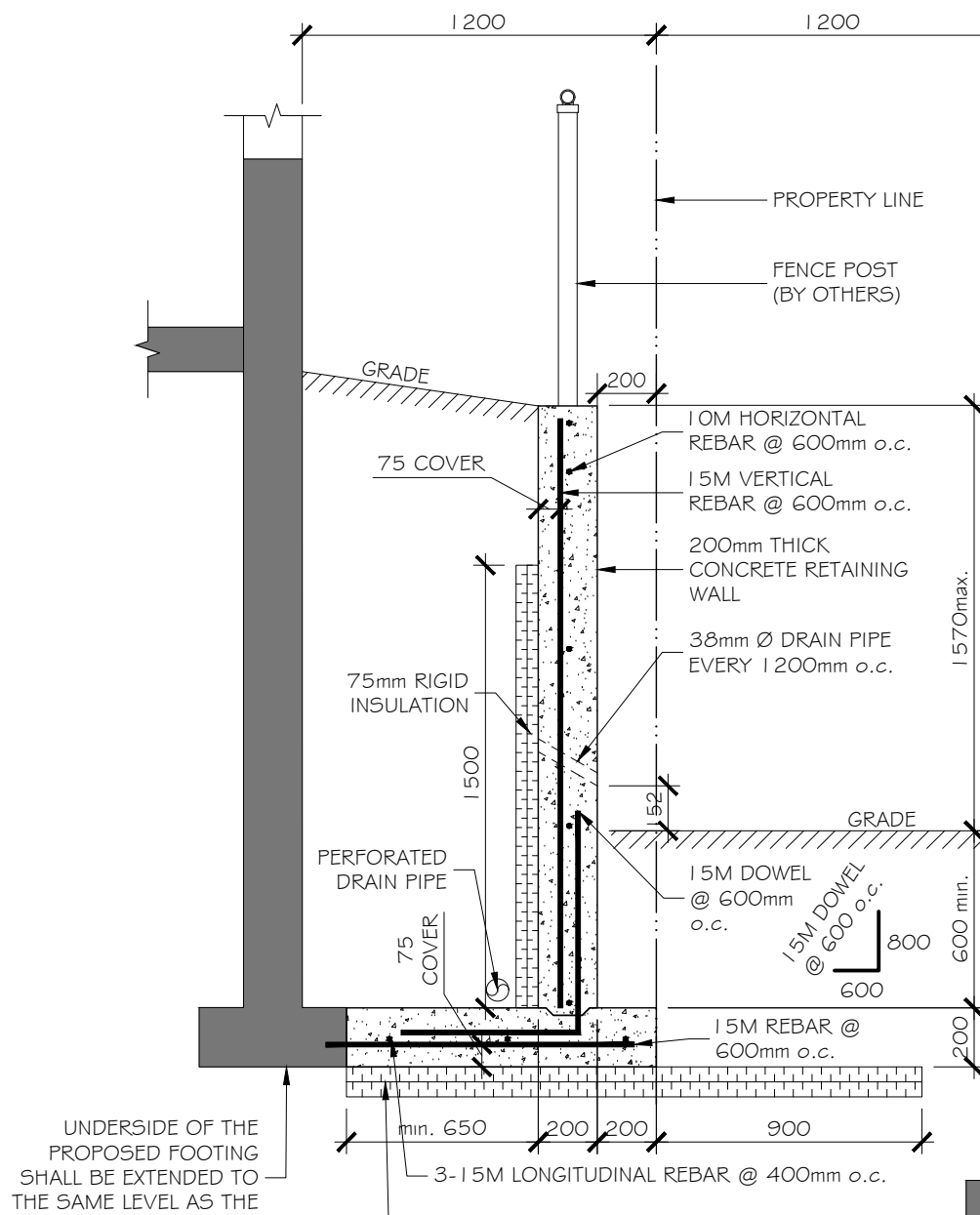
2 SK3 1:25 STONE STRONG RETAINING WALL CROSS SECTION



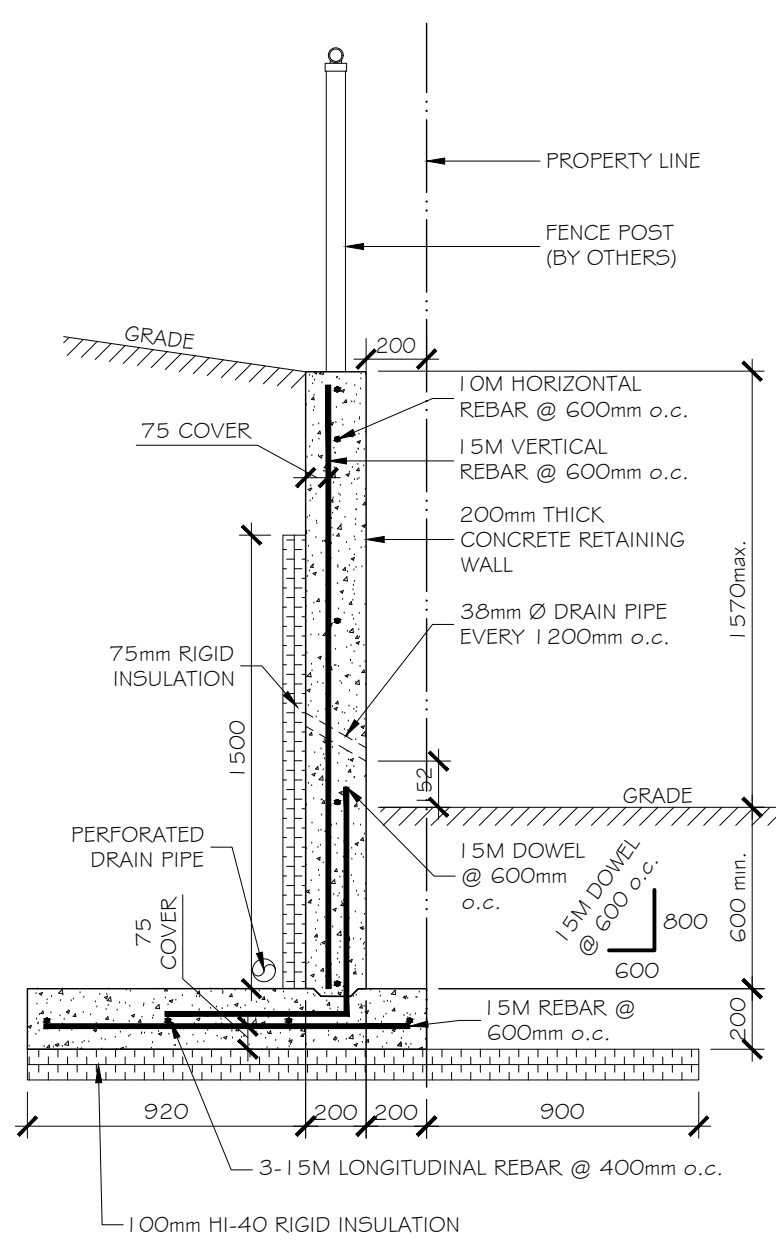
3 SK3 1:25 STONE STRONG RETAINING WALL CROSS SECTION



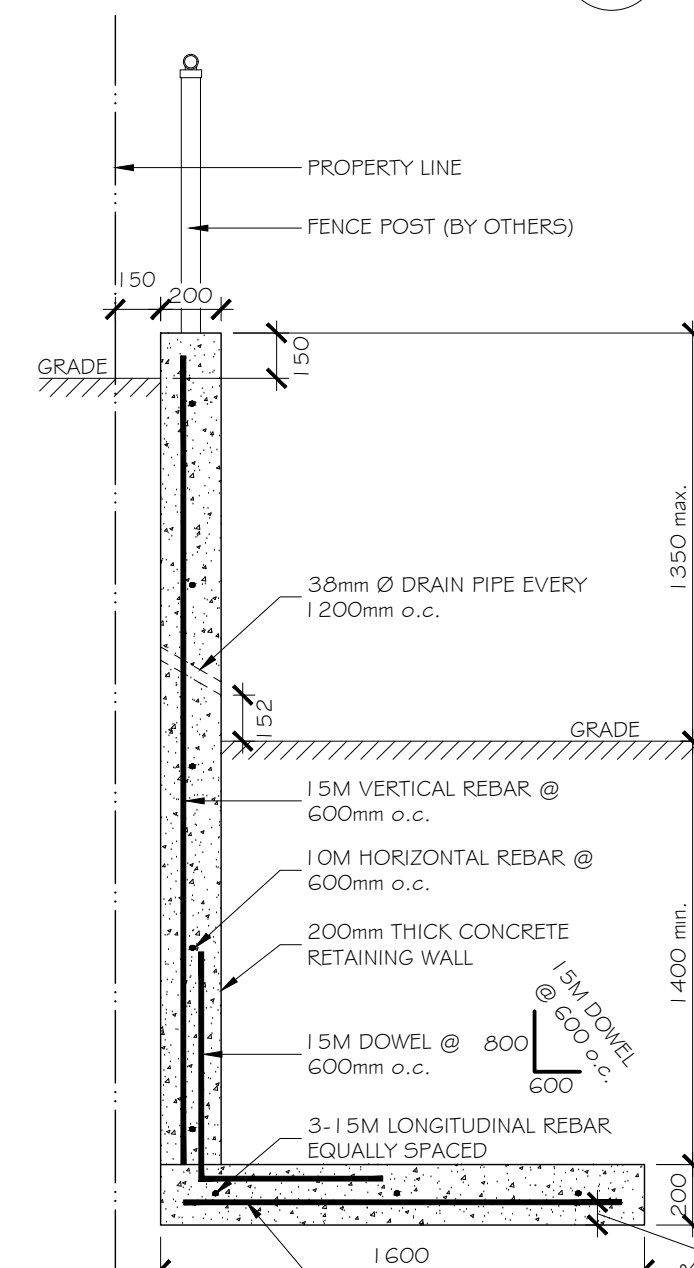
4 SK3 1:25 STONE WALL CROSSING RETAINING WALL CROSS SECTION



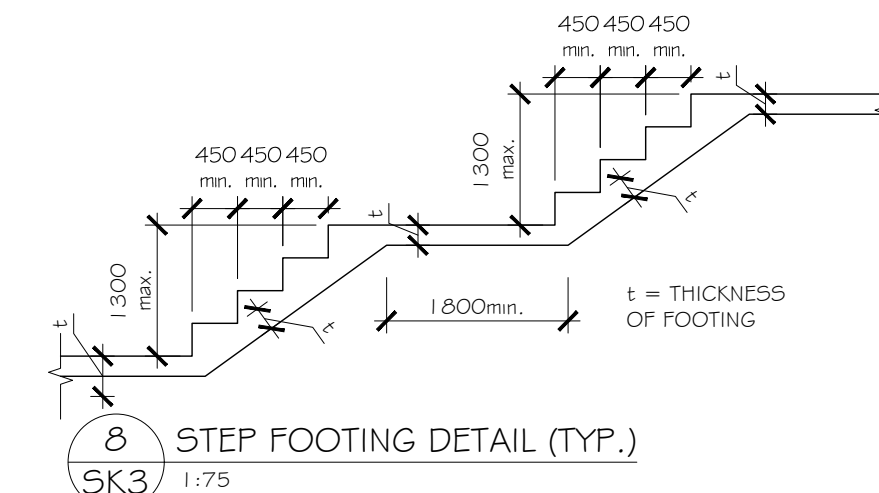
5 SK3 1:25 R.C. RETAINING WALL TYPE A #1



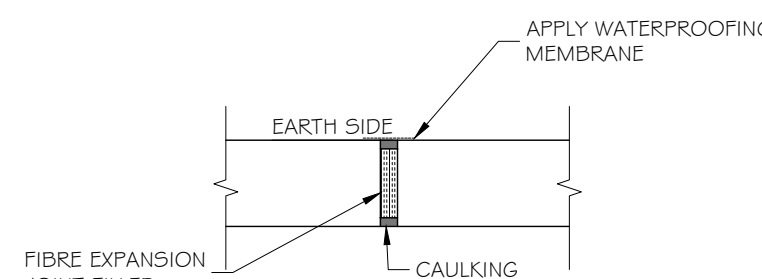
6 SK3 1:25 R.C. RETAINING WALL TYPE A #2



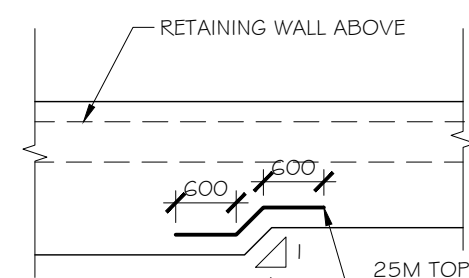
7 SK3 1:25 R.C. RETAINING WALL TYPE B



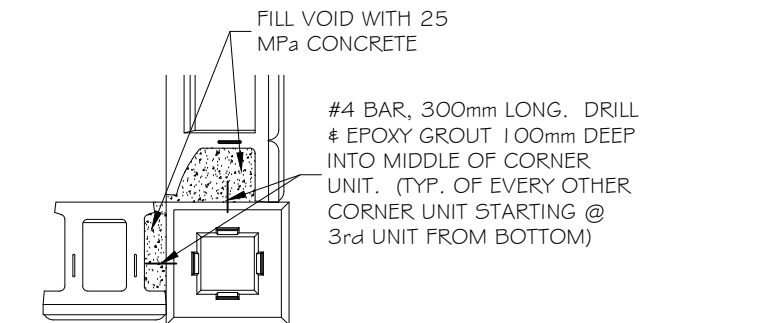
8 SK3 1:75 STEP FOOTING DETAIL (TYP.)



11 SK3 1:75 PLAN EXPANSION JOINT DETAIL



9 SK3 1:75 FOOTING WIDTH TRANSITION DETAIL PLAN (TYP.)



10 SK3 N.T.S. 90° CORNER TIEBACK

STONE STRONG V3-44 UNIT 	STONE STRONG V6-28 TOP UNIT 	STONE STRONG V24-44 UNIT 	STONE STRONG V24-44 UNIT 	STONE STRONG V24-M6 UNIT
STONE STRONG V6-28 UNIT 	STONE STRONG V3-28 UNIT 	STONE STRONG V3-28 TOP UNIT 	STONE STRONG V6-44 UNIT 	90° CORNER UNIT

11 SK3 N.T.S. INDIVIDUAL UNITS VIEW

GENERAL NOTES:

- ANY DEVIATION FROM CONDITIONS SHOWN ON THESE DRAWINGS, SHALL BE REPORTED TO THE ENGINEER.
- DESIGN LOADS:
 - SOIL PRESSURE $K_p=3.0$
 $K_a=.33$
 $\delta=20kN/m^3$
 - SURCHARGE (q) = 3.6 kPa
 - LATERAL LOAD ON FENCE (LL) = 0.75 kN/m
 - FACTOR OF SAFETY: 1.5

SEISMIC:
PEAK GROUND ACCELERATION = 0.28G
SITE CLASS D

- MATERIALS:
 - A) CONCRETE STRENGTH AT 28 DAYS TO BE 28 MPa w/ 5% TO 8% AIR ENTRAINMENT.
 - B) REINFORCING STEEL TO BE DEFORMED TYPE Fy = 400 MPa
 - C) UNIT FILL SHALL BE CLEAN COURSE GRANULAR MATERIAL. UNIT FILL SHALL FILL CAVITIES WITHIN AND BETWEEN THE UNITS
 - D) STONE STRING (S. S.) BLOCKS AS SHOWN IN SECTION DETAILS.
- ALL WORK TO BE CONDUCTED IN ACCORDANCE WITH THE ONTARIO BUILDING CODE (2012).
- ALL CONCRETE WORK TO BE CONDUCTED IN ACCORDANCE WITH CSA A23.3-19.
- SOIL BEARING TO BE 90kPa AS PER GEOTECHNICAL REPORT DATED FEB. 22, 2019 BY LRL ASSOCIATES LTD.
- SITE REVIEW OF STRUCTURAL ITEMS, AS NOTED ON THESE DRAWINGS, SHALL BE COORDINATED WITH LAMPKIN STRUCTURAL SERVICES LTD. THROUGH THE DURATION OF THE PROJECT.
- PROVIDE 75mm CONCRETE COVER FOR REBAR.
- min. LAP LENGTH TO BE 800mm FOR 15M & 500mm FOR 10M.

REVISED FOR SITE PLAN
CONTROL APPROVAL
APPLICATION

MARCH 11, 2021

ISSUE FOR PERMIT

MAY 27, 2020

REVISION

DATE

LAMPKIN
Structural Services Ltd.

34- 5330 CANOTEK ROAD
OTTAWA, ONTARIO K1J 9C4
PHONE: (613) 745-6437

CLIENT

NIVO DEVELOPMENTS INC.

PROJECT

1164-1166 HIGCROFT DRIVE

OTTAWA ONTARIO

TITLE

NEW RETAINING WALL

PROJECT # 20-14289

DRAWN BY R.L.

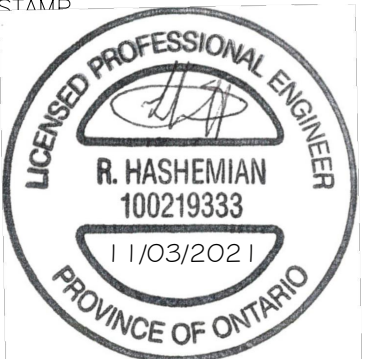
DRAWN BY R.H.

SCALE AS NOTED

DATE 11/03/2021

DRAWING #

SK3



INPUTS

PROJECT NAME

1164-1166 HIGCROFT DRIVE - TYPE A

Wall Geometry

Height of Wall stem:	H=	7.12	ft
Thickness of Base:	t=	8	in
Width of wall @ Top:	t ₁ =	8	in
Width of wall @ Base:	t ₂ =	8	in
Length of heel	t ₃ =	36	in
Length of toe	t ₄ =	8	in
Width of Base:	B=	4.33	ft

depth of shear key	d=	0	in
width of shear key	t ₅ =	0	in

Weight of Wall	W ₁ =	712.00	lb/ft
	W ₂ =	0.00	lb/ft
Weight of Base	W ₃ =	433.33	lb/ft
	a ₁ =	1.00	ft
	a ₂ =	3.67	ft
	a ₃ =	2.17	ft
Weight of Shear-key	W ₈ =	0.00	lb/ft

Soil Information

Height of soil above heel	H ₁ =	7.00	ft
Height of soil above toe	H _p =	2.00	ft
Unit weight of soil:	γ _a =	100	lb/ft ³
	γ _p =	100	lb/ft ³
Active earth-pressure coeff	K _a =	0.33	
Weight of soil above heel	W ₄ =	2100	lb/ft
	a ₄ =	2.83	ft
Weight of soil above toe	W ₅ =	133.33	lb/ft
	a ₅ =	0.33	ft
Resultant Horiz. Active Force	P _{H1} =	969.83	lb/ft (K _a · γ · H ₁ · H ₁ /2)
height of resultant	h _{p1} =	2.56	ft (H ₁ +t ₁ /3 above base)
Passive earth-pressure coeff	K _p =	3	
Resultant Horiz. Passive Force	P _{Hp} =	1066.67	lb/ft (K _p · γ · H _p · H _p /2)
height of resultant	h _p =	0.89	ft (H _p +t ₁ /3 above base)
Coefficient of friction	tan δ=	0.4	

Soil Type

GW, GP, SW
SP, SM, GC, GM
ML, SC
CL (very stiff to hard)

tan δ

0.55
0.45
0.35
0.4

Surcharge Loading

Uniform surcharge	q=	75	lb/ft ²
Resultant horiz. force	P _{H2} =	189.75	lb/ft (K _a · q · H ₁)
height of resultant:	h _{p2} =	3.83	ft (H ₁ /2 above base)
Weight of surcharge above heel	W ₆ =	225.00	lb/ft
	a ₆ =	2.83	ft

Uniform dead loads on wall	$W_7 =$	0.00	lb/ft
Line load	$Q_L =$	0	lb/ft
distance from wall:	$x_3 =$	0.8333333	ft
x_3/H_1	$m_3 =$	0.12	
Resultant horiz. force	$P_{H3} =$	0	lb/ft
height of resultant:	$h_{p3} =$	9.00	ft (above base)
Point load	$Q_P =$		lb
distance from wall:	$x_4 =$		ft
x_4/H_1	$m_4 =$		
Resultant horiz. force	$P_{H4} =$		lb
height of resultant:	$h_{p4} =$		ft (above base)

OUTPUTS

Total weight of retaining wall	$W =$	3603.67	lb/ft
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β	0.21
λ	1.00
ϕ_c	0.65
f_c	28.00 Mpa
d_v	128.20 mm

Resistance to Punch Shear	6232.33	lb
Punch Shear	536.25	lb
Sliding Factor of Safety	$F_S =$	11.62

Resistance to sliding	$F =$	2508.13	lb/ft ($P_{Hp} + W_{1-8} * \tan \delta$)
Sliding force ($P_{H1} + P_{H2} + P_{H3}$)	$P_H =$	1159.58	lb/ft (not including point load surcharge)
Sliding Factor of Safety	$F_S =$	2.16	if < 2.0 make wall larger or provide other resistance

Resisting moment	$M_{RM} =$	8282.83	ft-lb/ft
Overturning moment	$M_{OT} =$	3205.84	ft-lb/ft
Overturning Factor of Safety	$F_M =$	2.58	if < 1 make wall larger ; if < 2 make wall larger or reinforce wall for $2M_{OT} - M_{RM}$
$2M_{OT} - M_{RM}$	$=$	-1871.16	ft-lb/ft

Limits: location resultant force	$B/6 =$	0.72	ft
Location of resultant force	$1.44 < d < 2.89$		(idealy we
eccentricity in base	$d =$	1.41	ft (from toe of wall)
Effective base width	$e =$	0.76	ft ($B/2 - d$)
	$B' =$	2.82	ft ($B - 2e$)

Moment in base ($W_{1-6} * e$)	$M_{base} =$	2730.95	ft-lb/ft (design for $(2M_{OT} - M_{RM})$ if larger)
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Required soil bearing capacity using effective footing width	$q_a =$	1278.9467	lb/ft ² (Min.) (W_{1-6}/B')
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using $P/A + M/S$	$q_{max} =$	1704.2263	lb/ft ²
	$q_{min} =$	-40.995562	lb/ft ²

INPUTS

PROJECT NAME

1164-1166 HIGCROFT DRIVE - TYPE B

Wall Geometry

Height of Wall stem:	H=	8.20	ft
Thickness of Base:	t=	8	in
Width of wall @ Top:	t ₁ =	8	in
Width of wall @ Base:	t ₂ =	8	in
Length of heel	t ₃ =	0	in
Length of toe	t ₄ =	55	in
Width of Base:	B=	5.25	ft

depth of shear key	d=	0	in
width of shear key	t ₅ =	0	in

Weight of Wall	W ₁ =	820.00	lb/ft
	W ₂ =	0.00	lb/ft
Weight of Base	W ₃ =	525.00	lb/ft
	a ₁ =	4.92	ft
	a ₂ =	4.58	ft
	a ₃ =	2.63	ft
Weight of Shear-key	W ₈ =	0.00	lb/ft

Soil Information

Height of soil above heel	H ₁ =	9.00	ft
Height of soil above toe	H _p =	4.60	ft
Unit weight of soil:	γ _a =	100	lb/ft ³
	γ _p =	100	lb/ft ³
Active earth-pressure coeff	K _a =	0.33	
Weight of soil above heel	W ₄ =	0	lb/ft
	a ₄ =	5.25	ft
Weight of soil above toe	W ₅ =	2108.33	lb/ft
	a ₅ =	2.29	ft
Resultant Horiz. Active Force	P _{H1} =	1541.83	lb/ft (K _a * γ * H ₁ * H ₁ /2)
height of resultant	h _{p1} =	3.22	ft (H ₁ +t ₁ /3 above base)
Passive earth-pressure coeff	K _p =	3	
Resultant Horiz. Passive Force	P _{Hp} =	4160.67	lb/ft (K _p * γ * H _p * H _p /2)
height of resultant	h _p =	1.76	ft (H _p +t ₁ /3 above base)
Coefficient of friction	tan δ=	0.4	

Soil Type

GW, GP, SW	tan δ
SP, SM, GC, GM	0.55
ML, SC	0.45
CL (very stiff to hard)	0.35
	0.4

Surcharge Loading

Uniform surcharge	$q =$	75	lb/ft ²
Resultant horiz. force	$P_{H2} =$	239.25	lb/ft ($K_a \cdot q \cdot H_1$)
height of resultant:	$h_{p2} =$	4.83	ft ($H_1/2$ above base)
Weight of surcharge above heel	$W_6 =$	0.00	lb/ft
	$a_6 =$	5.25	ft
Uniform dead loads on wall	$W_7 =$	0.00	lb/ft
Line load	$Q_L =$	100	lb/ft
distance from wall:	$x_3 =$	0.8333333	ft
x_3/H_1	$m_3 =$	0.09	
Resultant horiz. force	$P_{H3} =$	55	lb/ft
height of resultant:	$h_{p3} =$	11.20	ft (above base)
Point load	$Q_P =$		lb
distance from wall:	$x_4 =$		ft
x_4/H_1	$m_4 =$		
Resultant horiz. force	$P_{H4} =$		lb
height of resultant:	$h_{p4} =$		ft (above base)

OUTPUTS

Total weight of retaining wall	$W =$	3453.33	lb/ft
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	β	0.21	
	λ	1.00	
	ϕ_c	0.65	
	f_c	28.00	Mpa
	d_v	128.20	mm
Resistance to Punch Shear		6232.33	lb
Punch Shear		428.34	lb
Sliding Factor of Safety	$F_S =$	14.55	

Resistance to sliding	$F =$	5542.00	lb/ft ($P_{H0} + W_{1-8} \cdot \tan \delta$)
Sliding force ($P_{H1} + P_{H2} + P_{H3}$)	$P_H =$	1836.08	lb/ft (not including point load surcharge)
Sliding Factor of Safety	$F_S =$	3.02	if < 2.0 make wall larger or provide other resistance

Resisting moment	$M_{RM} =$	10241.39	ft-lb/ft
Overturning moment	$M_{OT} =$	6740.50	ft-lb/ft
Overturning Factor of Safety	$F_M =$	1.52	if < 1 make wall larger ; if < 2 make wall larger or reinforce wall for $2M_{OT} - M_{RM}$

Bearing Capacity Check

Soil bearing capacity	90.00	kPa
toe length	1.60	m
Height of exposed wall	1.35	m
Height of soil above toe	1.40	m
Base Depth	0.20	m
Unit weight of soil:	20.00	kn/m3
K_a	0.33	
K_p	3.00	

Resultant Horiz. Active Force	28.72	kN
Arm to pivot point	0.98	m

Weight of soil	44.80	kN
Arm to pivot point	0.80	m

Resultant Horiz. Passive Force	76.80	kN
Arm to pivot point	0.53	m

Required resisting moment from soil

Force equilibrium in z

Soil reaction	44.80	kN
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Moment equilibrium about pivot point

Resisting moment due to reaction	23.12	kN.m
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Arm of soil reaction to Pivot	0.52	
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Max stress below footing	82.19	ok
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Min stress below footing	-26.19	
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Calc by: **R.H.**

3/8/21 13:52

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External Stability OK!

height above top of wall **1** m

toe slope		H:1V slope
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 μ_b 0.69

©

S T O N E

S T R O N G

S Y S T E M S

 μ_b 0.69

Project Name: **Nivo Developments Inc**
 Location: **1164-1166 Higcroft Dr.**
 Job#: **20-14289**
 Section: **Stone Strong 1.6 m TYPE 1**
 Calc by: **R.H.**

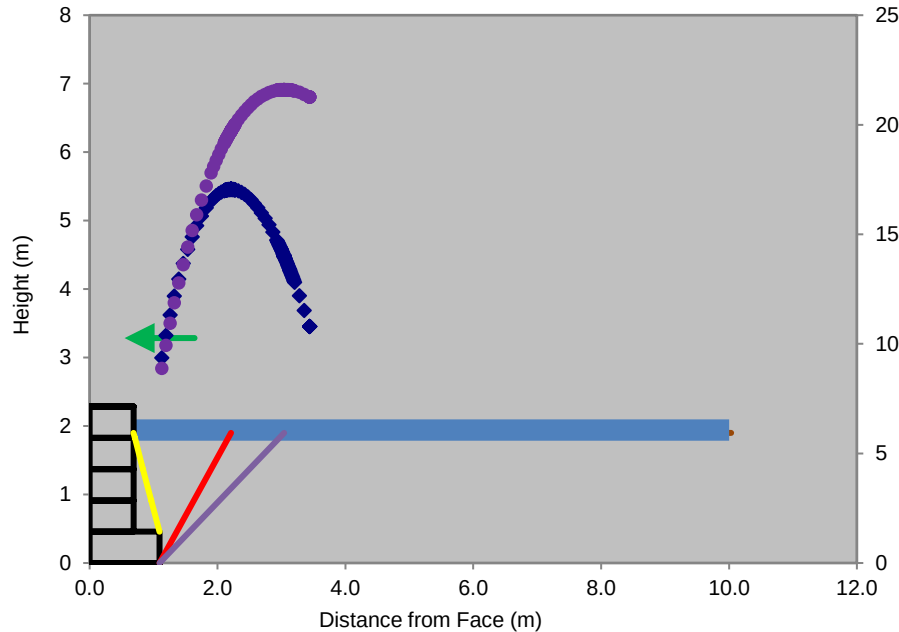
Seismic Load PGA **0.28** G site class (A to E or 1) **D** Fpga 1.24 Fa 1.58 k_h 0.21

Backfill Slope & Surcharge

length 1 **10** m (horizontal)
 length 2 m (horizontal)
 length 3 m (horizontal)
 length 4 m (horizontal)
 effective slope H:1V slope
 failure plane α 59.52 deg

rise in grade
0 m
 m
 m
 m
 β 0.0 deg
 zone of influence 2.21 m

LL surcharge
3.6 kPa
 kPa
 kPa
 kPa
 tier height
 m
 m
 m
 avg q 4 kPa



Ground Surface & Trial Wedge Plot

Unfactored Loads

$K_a =$	0.397	$K_{AE} =$	0.599
$P_h =$	11.80 kN	$\Delta K_{AE} =$	0.201
$P_v =$	8.14 kN	$P_{IR} =$	8.35 kN
$Q_{lh} =$	1.86 kN	$\Delta P_{AEh} =$	5.99 kN
$Q_{lv} =$	1.28 kN	$\Delta P_{AEv} =$	4.13 kN

Project Name: **Nivo Developments Inc**
 Location: **1164-1166 Higgroft Dr.**
 Job#: **20-14289**
 Section: **Stone Strong 1.6 m TYPE 1**
 Calc by: **R.H.**

<u>Load Cases:</u>		ULS	ULS	ULS	ULS	ULS	ULS	SLS	
		1-a	1-b	5-a (EQ)	5-b (EQ)	8 (Coll)	9	1	
<u>Factored Loading</u>	Overturning (kN-m):	12	12	18	19	11	9	9	OK!
	Sliding (kN):	18	18	21	23	13	15	13	OK!
	Bearing (kPa):	61	74	98	98	61	69	59	OK!
	e (m):	0.23	0.19	0.44	0.38	0.23	0.16	0.18	OK!
	Bf (m):	0.84	0.90	0.42	0.53	0.83	0.98	0.93	
<u>Factored Resistance</u>	Overturning (kN-m):	27	34	22	27	26	34	28	
	Sliding (kN):	23	31	25	31	24	32	31	
	Bearing (kPa):	140	143	140	141	141	143	276	
	(@ top of base) Max e (m):	0.33	0.33	0.44	0.44	0.44	0.33	0.33	
<u>Load & Resistance Factors</u>	L	1.70	1.70	0.00	0.00	0.00	0.00	0.90	
	E	1.25	1.25	0.80	1.00	1.00	1.25	1.00	
	EQ	0.00	0.00	1.00	1.00	0.00	0.00	0.00	
	H	0.00	0.00	0.00	0.00	1.00	0.00	0.00	
	LL Surcharge over Wall	0.00	1.70	0.00	0.00	0.00	0.00	0.90	
	DC	0.95	1.10	0.80	1.00	1.00	1.35	1.00	
	DE	0.80	1.25	0.80	1.00	1.00	1.35	1.00	
	BC	0.50	0.50	0.50	0.50	0.50	0.50	1.00	
	φt precast to agg	0.80	0.80	1.00	1.00	0.80	0.80	1.00	
	φt CIP to agg/soil	0.80	0.80	1.00	1.00	0.80	0.80	1.00	
	φt soil to soil	0.80	0.80	1.00	1.00	0.80	0.80	1.00	
	φt precast to precast	0.80	0.80	1.00	1.00	0.80	0.80	1.00	
	concrete interface - eccentricity limit	0.30	0.30	0.40	0.40	0.40	0.30	0.30	
	bearing on soil - eccentricity limit	0.30	0.30	0.40	0.40	0.40	0.30	0.30	

 μ_b 0.68

Project Name: **Nivo Developments Inc**
 Location: **1164-1166 Higcroft Dr.**
 Job#: **20-14289**
 Section: **Stone Strong 2.35 m**
 Calc by: **R.H.**

Seismic Load

 PGA **0.28** G

 site class (A to E or 1) **D**

 Fpga 1.24 Fa 1.58 k_h 0.21

Backfill Slope & Surcharge

length 1 **5** m (horizontal)
 length 2 m (horizontal)
 length 3 m (horizontal)
 length 4 m (horizontal)

effective slope H:1V slope

failure plane α 57.20 deg

rise in grade

0 m
 m
 m
 m

β 0.0 deg

LL surcharge

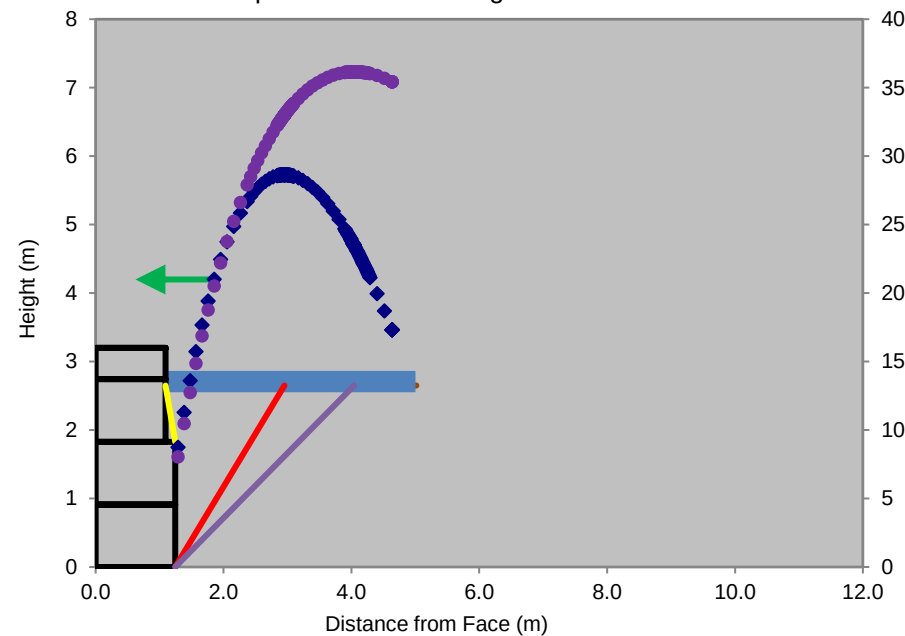
6 kPa
 kPa
 kPa
 kPa

avg q 6 kPa

tier height

m
 m
 m

zone of influence 2.95 m


**Ground Surface &
Trial Wedge Plot**
Unfactored Loads

K_a = 0.333
 P_h = 20.76 kN
 P_v = 10.70 kN
 Q_{lh} = 4.66 kN
 Q_{lv} = 2.40 kN

K_{AE} = 0.515
 ΔK_{AE} = 0.182
 P_{IR} = 16.49 kN
 ΔP_{AEh} = 11.38 kN
 ΔP_{AEv} = 5.86 kN

Project Name: **Nivo Developments Inc**
 Location: **1164-1166 Higgroft Dr.**
 Job#: **20-14289**
 Section: **Stone Strong 2.35 m**
 Calc by: **R.H.**

Load Cases:

		ULS 1-a	ULS 1-b	ULS 5-a (EQ)	ULS 5-b (EQ)	ULS 8 (Coll)	ULS 9	SLS 1	
<u>Factored Loading</u>	Overturning (kN-m):	33	33	49	53	23	23	24	OK!
	Sliding (kN):	34	34	39	43	22	26	25	OK!
	Bearing (kPa):	82	100	138	132	71	88	77	OK!
	e (m):	0.19	0.13	0.50	0.41	0.10	0.04	0.10	OK!
	Bf' (m):	1.17	1.28	0.55	0.72	1.35	1.47	1.35	
<u>Factored Resistance</u>	Overturning (kN-m):	71	91	58	72	69	92	75	
	Sliding (kN):	42	59	45	56	44	59	59	
	Bearing (kPa):	140	143	140	141	141	143	276	
	(@ top of base) Max e (m):	0.37	0.37	0.50	0.50	0.50	0.37	0.37	
<u>Load & Resistance Factors</u>	L	1.70	1.70	0.00	0.00	0.00	0.00	0.90	
	E	1.25	1.25	0.80	1.00	1.00	1.25	1.00	
	EQ	0.00	0.00	1.00	1.00	0.00	0.00	0.00	
	H	0.00	0.00	0.00	0.00	1.00	0.00	0.00	
	LL Surcharge over Wall	0.00	1.70	0.00	0.00	0.00	0.00	0.90	
	DC	0.95	1.10	0.80	1.00	1.00	1.35	1.00	
	DE	0.80	1.25	0.80	1.00	1.00	1.35	1.00	
	BC	0.50	0.50	0.50	0.50	0.50	0.50	1.00	
	φt precast to agg	0.80	0.80	1.00	1.00	0.80	0.80	1.00	
	φt CIP to agg/soil	0.80	0.80	1.00	1.00	0.80	0.80	1.00	
	φt soil to soil	0.80	0.80	1.00	1.00	0.80	0.80	1.00	
	φt precast to precast	0.80	0.80	1.00	1.00	0.80	0.80	1.00	
	concrete interface - eccentricity limit	0.30	0.30	0.40	0.40	0.40	0.30	0.30	
	bearing on soil - eccentricity limit	0.30	0.30	0.40	0.40	0.40	0.30	0.30	

Project Name: **Nivo Developments Inc**
 Location: **1164-1166 Higcroft Dr.**
 Job#: **20-14289**
 Section: **Stone Strong 2.35 at Corner**
 Calc by: **R.H.**

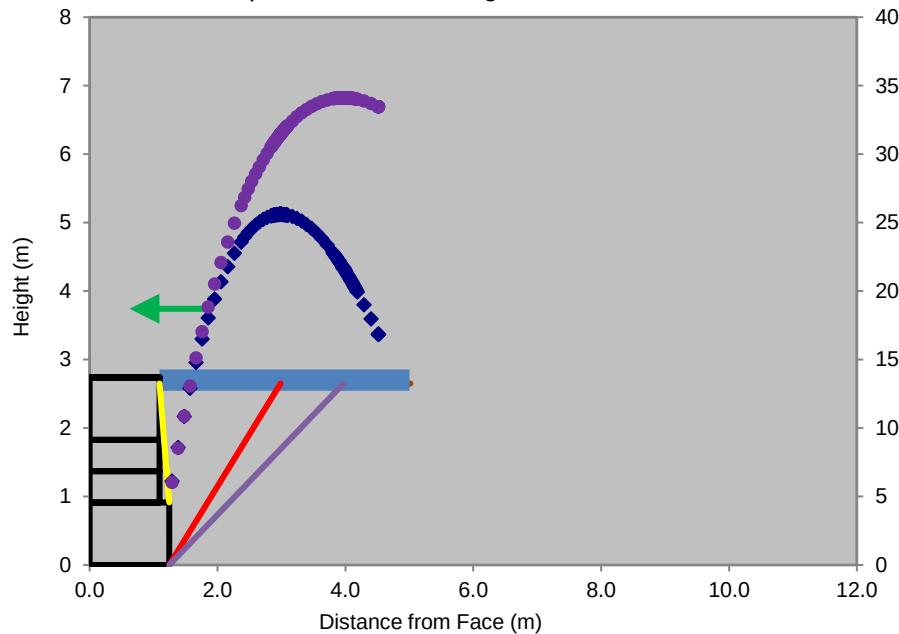
Seismic Load PGA **0.28** G site class (A to E or 1) **D** Fpga 1.24 Fa 1.58 k_h 0.20

Backfill Slope & Surcharge

length 1 **5** m (horizontal)
 length 2 m (horizontal)
 length 3 m (horizontal)
 length 4 m (horizontal)
 effective slope H:1V slope
 failure plane α 56.70 deg

rise in grade **0** m
 m
 m
 m
 β 0.0 deg
 zone of influence 2.99 m

LL surcharge **3.6** kPa
 kPa
 kPa
 kPa
 tier height m
 m
 m
 avg q 4 kPa



Ground Surface & Trial Wedge Plot

Unfactored Loads

K_a = 0.330
 P_h = 20.87 kN
 P_v = 10.08 kN
 Q_{lh} = 2.83 kN
 Q_{lv} = 1.37 kN

K_{AE} = 0.486
 ΔK_{AE} = 0.156
 P_{IR} = 13.04 kN
 ΔP_{AEh} = 9.85 kN
 ΔP_{AEv} = 4.76 kN

Project Name: **Nivo Developments Inc**
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Load Cases:

		ULS 1-a	ULS 1-b	ULS 5-a (EQ)	ULS 5-b (EQ)	ULS 8 (Coll)	ULS 9	SLS 1	
<u>Factored Loading</u>	Overturning (kN-m):	29	29	40	44	22	23	22	OK!
	Sliding (kN):	31	31	35	39	22	26	23	OK!
	Bearing (kPa):	77	90	119	118	69	84	71	OK!
	e (m):	0.25	0.18	0.50	0.43	0.17	0.11	0.15	OK!
	Bf' (m):	1.05	1.18	0.55	0.69	1.20	1.32	1.24	
<u>Factored Resistance</u>	Overturning (kN-m):	57	73	48	59	56	75	60	
	Sliding (kN):	36	49	39	49	38	51	50	
	Bearing (kPa):	140	143	140	141	141	143	276	
	(@ top of base) Max e (m):	0.37	0.37	0.50	0.50	0.50	0.37	0.37	
<u>Load & Resistance Factors</u>	L	1.70	1.70	0.00	0.00	0.00	0.00	0.90	
	E	1.25	1.25	0.80	1.00	1.00	1.25	1.00	
	EQ	0.00	0.00	1.00	1.00	0.00	0.00	0.00	
	H	0.00	0.00	0.00	0.00	1.00	0.00	0.00	
	LL Surcharge over Wall	0.00	1.70	0.00	0.00	0.00	0.00	0.90	
	DC	0.95	1.10	0.80	1.00	1.00	1.35	1.00	
	DE	0.80	1.25	0.80	1.00	1.00	1.35	1.00	
	BC	0.50	0.50	0.50	0.50	0.50	0.50	1.00	
	φt precast to agg	0.80	0.80	1.00	1.00	0.80	0.80	1.00	
	φt CIP to agg/soil	0.80	0.80	1.00	1.00	0.80	0.80	1.00	
	φt soil to soil	0.80	0.80	1.00	1.00	0.80	0.80	1.00	
	φt precast to precast	0.80	0.80	1.00	1.00	0.80	0.80	1.00	
	concrete interface - eccentricity limit	0.30	0.30	0.40	0.40	0.40	0.30	0.30	
	bearing on soil - eccentricity limit	0.30	0.30	0.40	0.40	0.40	0.30	0.30	