



PROVOST &  
PRITCHARD

PARRISH  
HANSEN  
STRUCTURAL DIVISION

# STRUCTURAL CALCULATION

Job: 1900-23-004

January 19, 2024

## City View Housing

### Bakersfield, CA

#### Client:

Ordiz Melbey Architects  
5500 Ming Ave, suite 280  
Bakersfield, CA 93309

#### Revisions:

⚠ 08-06-2024 (Retaining wall)

#### SHEET INDEX


Loading	2
Roof Framing	3
Floor Framing	16
Lateral Loads	27
Posts & Studs	45
Foundations	55
Light Pole Ftg.	60
Retaining Walls	61 ⚠

#### CODES

2022 California Building Code  
94 mph Wind Gust  
Exposure C  
Wind Speed = 94 mph



This set of calculations has been prepared as a design guide for the Engineer's use in verifying minimum code requirements and consideration of design options and is not part of the construction documents. Information contained herein does not necessarily represent the actual engineering design conditions and shall not be used for construction purposes. Plan check use of these calculations is for reference purposes only.

PROJECT TITLE:  City View Housing	DATE: 08/06/2024	SHEET  601 
	BY: CP	
	PROJECT: 1900-23-004	

Retaining wall calc.

per soils report ADDENDUM 2 - retaining wall (SEI File No. 141629)

"For yielding wall, the seismic increment of active lateral earth pressure can be taken as 12.2 HZ (pounds per linear foot of wall length) acting at 1.6 ft above the wall base.

$$4' \text{ Wall} : 12.2 \times 4' = 49 \# / \text{ft} \\ @ 3.1'$$

$$5.5' \text{ Wall} : 5.5' = 67 \# / \text{ft} \\ @ 3.5'$$

$$7' \text{ wall} : @ 7' = 98 \# / \text{ft} \\ @ 4.2'$$

Project Title:  
 Engineer:  
 Project ID:  
 Project Descr:

Project: 24-00008434

Date: 9/27/2024


 BAKERSFIELD  
 INC. 10000 W. Broadway Blvd.

## Cantilevered Retaining Wall

Project File: CITY VIEW.ec6

LIC# : KW-06015395, Build:20.22.10.25

PROVOST &amp; PRITCHARD ENGINEERING GROUP INC

(c) ENERCALC INC 1983-2022

**DESCRIPTION:** 4' WALL

### Code Reference:

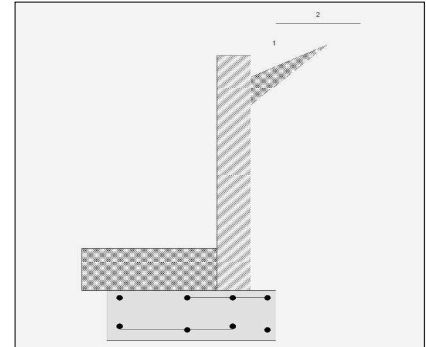
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

#### Criteria

Retained Height	=	5.00 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	2.00
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft

#### Soil Data

Allow Soil Bearing	=	2,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	45.0 psf/ft
	=	
Passive Pressure	=	400.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing  Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



#### Surcharge Loads

Surcharge Over Heel	=	0.0 psf
NOT Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
NOT Used for Sliding & Overturning		

#### Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

#### Lateral Load Applied to Stem

Lateral Load	=	49.0 #/ft
...Height to Top	=	3.50 ft
...Height to Bottom	=	2.50 ft
Load Type	=	Seismic (E) (Service Level)
Wind on Exposed Stem	=	0.0 psf (Strength Level)

#### Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type	=	Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Ratio > 1.0				
0.00				
Masonry				
ASD	SD	SD	SD	
8.00				
# 5				
24.00				
Center				

#4@ 15.87 in  
#5@ 24.60 in  
#6@ 34.92 in

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**DESCRIPTION: 4' WALL**

### Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING.....				.....RESISTING.....		
	Force lbs	Distance ft	Moment ft-#		Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	926.5	2.14	1,981.6	Soil Over HL (ab. water tbl)	275.2	3.08	848.6
HL Act Pres (be water tbl)				Soil Over HL (bel. water tbl)		3.08	848.6
Hydrostatic Force				Water Table			
Buoyant Force =				Sloped Soil Over Heel =	6.9	3.17	21.8
Surcharge over Heel =				Surcharge Over Heel =			
Surcharge Over Toe =				Adjacent Footing Load =			
Adjacent Footing Load =				Axial Dead Load on Stem =			
Added Lateral Load =	49.0	4.17	204.2	* Axial Live Load on Stem =			
Load @ Stem Above Soil =				Soil Over Toe =	238.4	1.08	258.3
				Surcharge Over Toe =			
				Stem Weight(s) =	462.0	2.50	1,155.2
				Earth @ Stem Transitions =			
				Footing Weight =	583.5	1.67	972.6
				Key Weight =			
				Vert. Component =	437.1	3.33	1,457.2
<b>Total</b>	=	975.5	<b>O.T.M. =</b>	<b>Total =</b>	2,003.0 lbs	<b>R.M. =</b>	4,713.7
			2,185.8				
<b>Resisting/Overturning Ratio</b>			<b>= 2.16</b>				
Vertical Loads used for Soil Pressure =		2,003.0	lbs				
* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.							

\* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS considered in the calculation of Overturning Resistance.

### Tilt

#### Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus 250.0 pci

Horizontal Defl @ Top of Wall (approximate only) 0.024 in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe.

because the wall would then tend to rotate into the retained soil.

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## Cantilevered Retaining Wall

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(c) ENERCALC INC 1983-2022

**DESCRIPTION:** 4' WALL

### Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom

Stem Design Height: 0.00 ft above top of footing

Calculated Rebar Stress,  $f_s$  = 24292.35 psi

Lap Splice length for #5 bar specified in this stem design segment = 45.55 in

Development length for #5 bar specified in this stem design segment = 45.55 in

Hooked embedment length into footing for #5 bar specified in this stem design segment = 6.39 in

As Provided = 0.1550 in<sup>2</sup>/ft

As Required = 0.1928 in<sup>2</sup>/ft

Project Title:  
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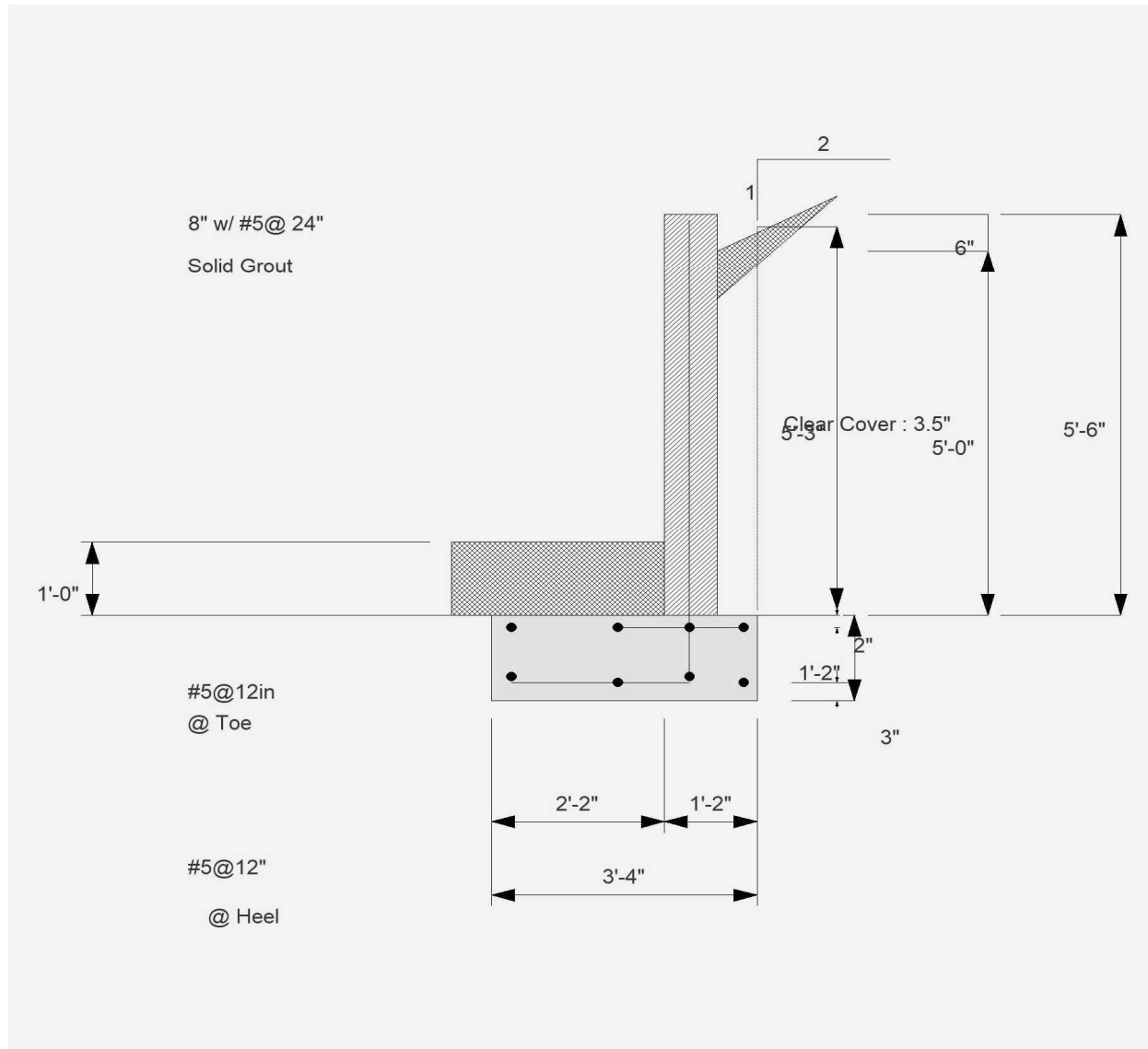
BAKERSFIELD  
AEC/CM/CO-OP/Consulting/Other**Cantilevered Retaining Wall**

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BAKERSFIELD  
ENGINEERING GROUP

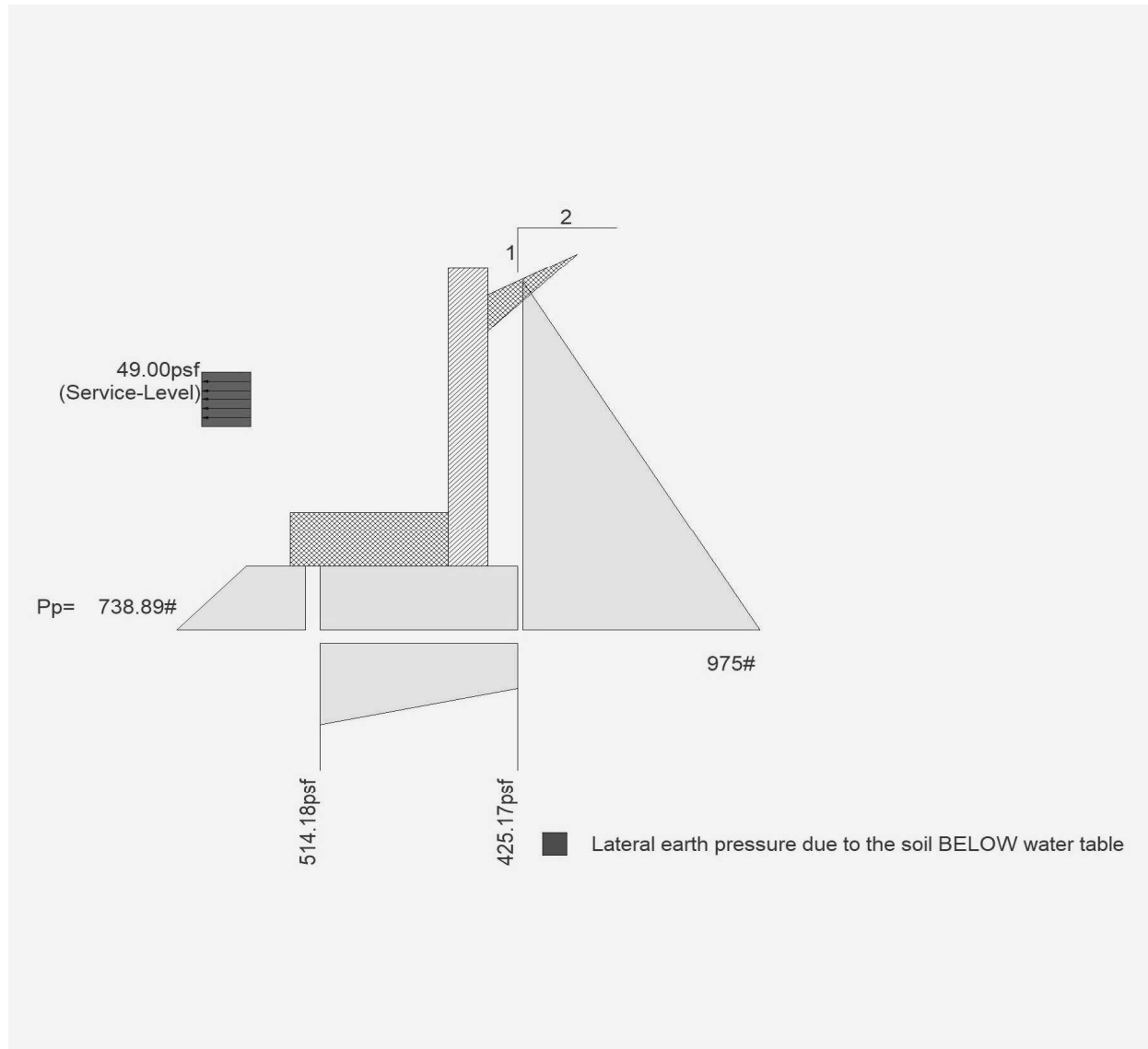
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PROVOST &amp; PRITCHARD ENGINEERING GROUP INC

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**DESCRIPTION:** 5.5' WALL

### Code Reference:

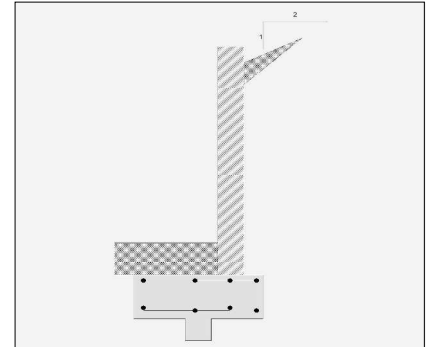
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

#### Criteria

Retained Height	=	6.50 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	2.00
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft

#### Soil Data

Allow Soil Bearing	=	2,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	45.0 psf/ft
	=	
Passive Pressure	=	400.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing  Soil Friction	=	0.450
Soil height to ignore for passive pressure	=	12.00 in



#### Surcharge Loads

Surcharge Over Heel	=	0.0 psf
NOT Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
NOT Used for Sliding & Overturning		

#### Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

#### Lateral Load Applied to Stem

Lateral Load	=	67.0 #/ft
...Height to Top	=	3.80 ft
...Height to Bottom	=	2.80 ft
Load Type	=	Seismic (E) (Strength Level)
Wind on Exposed Stem	=	0.0 psf (Strength Level)

#### Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type	=	Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300



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BAKERSFIELD  
A Division of Consulting Solutions

## Cantilevered Retaining Wall

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### DESCRIPTION: 5.5' WALL

#### Footing Data

Toe Width	=	2.17 ft
Heel Width	=	1.17
Total Footing Width	=	3.33
Footing Thickness	=	16.00 in
Key Width	=	8.00 in
Key Depth	=	8.00 in
Key Distance from Toe	=	1.33 ft
f'c =	3,000 psi	Fy = 60,000 psi
Footing Concrete Density	=	150.00 pcf
Min. As %	=	0.0018
Cover @ Top	2.00	@ Btm.= 3.00 in

#### Footing Design Results

	Toe	Heel
Factored Pressure	= 1,563	54 psf
Mu' : Upward	= 2,901	0 ft-#
Mu' : Downward	= 1,008	788 ft-#
Mu: Design	= 1,894 OK	788 ft-# OK
phiMn	= 24,143	26,123 ft-#
Actual 1-Way Shear	= 9.48	10.29 psi
Allow 1-Way Shear	= 82.16	82.16 psi
Toe Reinforcing	= # 6 @ 12.00 in	
Heel Reinforcing	= # 6 @ 12.00 in	
Key Reinforcing	= None Spec'd	
Footing Torsion, Tu	=	0.00 ft-lbs
Footing Allow. Torsion, phi Tu	=	0.00 ft-lbs

**If torsion exceeds allowable, provide supplemental design for footing torsion.**

#### Other Acceptable Sizes & Spacings

Toe: #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.83 in, #8@ 27.43 in, #9@ 34.72 in, #10@ 44.09 in

Heel: #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.83 in, #8@ 27.43 in, #9@ 34.72 in, #10@ 44.09 in

Key:  $\phi Mn = \phi i^5 \lambda \sqrt{f'c} S_m$

Min footing T&S reinf Area 1.15 in<sup>2</sup>  
 Min footing T&S reinf Area per foot 0.35 in<sup>2</sup> /ft

#### If one layer of horizontal bars:

#4@ 6.94 in  
 #5@ 10.76 in  
 #6@ 15.28 in

#### If two layers of horizontal bars:

#4@ 13.89 in  
 #5@ 21.53 in  
 #6@ 30.56 in

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**DESCRIPTION: 5.5' WALL**

### Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING.....			.....RESISTING.....			
	Force lbs	Distance ft	Moment ft-#	Force lbs	Distance ft	Moment ft-#	
HL Act Pres (ab water tbl)	1,470.2	2.69	3,961.5	Soil Over HL (ab. water tbl)	357.7	3.08	1,103.2
HL Act Pres (be water tbl)				Soil Over HL (bel. water tbl)		3.08	1,103.2
Hydrostatic Force				Water Table			
Buoyant Force =				Sloped Soil Over Heel =	6.9	3.17	21.8
Surcharge over Heel =				Surcharge Over Heel =			
Surcharge Over Toe =				Adjacent Footing Load =			
Adjacent Footing Load =				Axial Dead Load on Stem =			
Added Lateral Load =	46.9	4.63	217.3	* Axial Live Load on Stem =			
Load @ Stem Above Soil =				Soil Over Toe =	238.4	1.08	258.3
				Surcharge Over Toe =			
				Stem Weight(s) =	588.0	2.50	1,470.2
				Earth @ Stem Transitions =			
				Footing Weight =	666.8	1.67	1,111.6
				Key Weight =	66.7	1.66	110.9
				Vert. Component =	693.6	3.33	2,312.5
<b>Total</b>	= 1,517.1	<b>O.T.M.</b>	= 4,178.8	<b>Total =</b>	2,618.1 lbs	<b>R.M.=</b>	6,388.4
<b>Resisting/Overturning Ratio</b>		=	<b>1.53</b>	* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.			
Vertical Loads used for Soil Pressure =		2,618.1	lbs				

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS considered in the calculation of Overturning Resistance.

### Tilt

#### Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus 250.0 pci

Horizontal Defl @ Top of Wall (approximate only) 0.065 in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe.

because the wall would then tend to rotate into the retained soil.

Project Title:  
Engineer:  
Project ID:  
Project Descr:

APPROVED



**Cantilevered Retaining Wall**

Project File: CITY VIEW.ec6

LIC# : KW-06015395, Build:20.22.10.25

PROVOST & PRITCHARD ENGINEERING GROUP INC

(c) ENERCALC INC 1983-2022

**DESCRIPTION: 5.5' WALL**

**Rebar Lap & Embedment Lengths Information**

Stem Design Segment: Bottom

Stem Design Height: 0.00 ft above top of footing

K\_cover=7.25, K\_spacing=16, K\_diam=6.75, and K\_min=6.75

Lap Splice length for #6 bar specified in this stem design segment = 30.00 in

Development length for #6 bar specified in this stem design segment = 18.89 in

Hooked embedment length into footing for #6 bar specified in this stem design segment = 11.50 in

As Provided = 0.3300 in<sup>2</sup>/ft

As Required = 0.2159 in<sup>2</sup>/ft

Project Title:  
Engineer:  
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Project: 24-00008434

Date: 9/27/2024

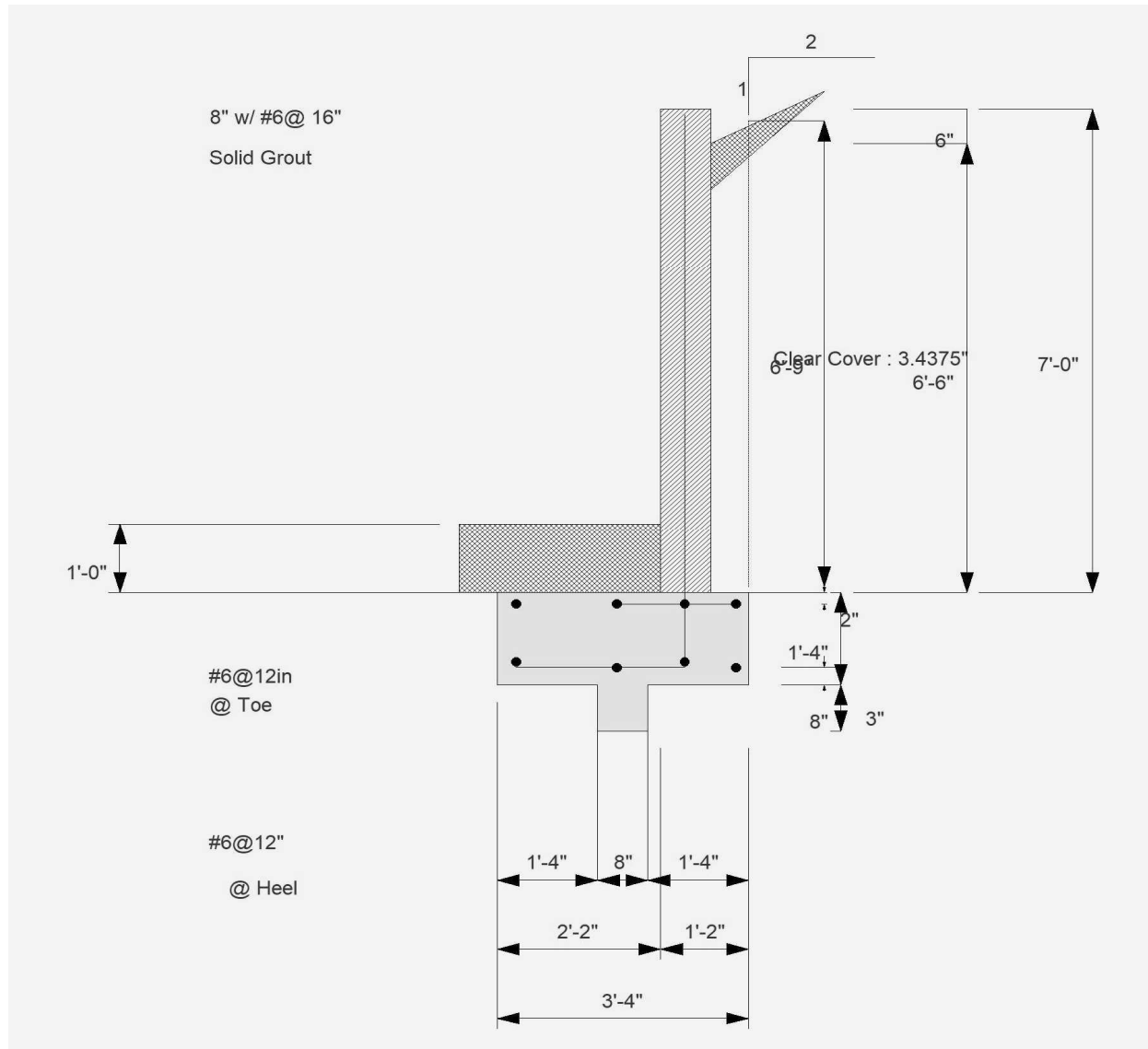
BAKERSFIELD  
PUBLIC WORKS & CONSTRUCTION**Cantilevered Retaining Wall**

Project File: CITY VIEW.ec6

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PROVOST &amp; PRITCHARD ENGINEERING GROUP INC

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**DESCRIPTION: 5.5' WALL**

Project Title:  
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Project: 24-00008434

Date: 9/27/2024

BAKERSFIELD  
ENGINEERING GROUP

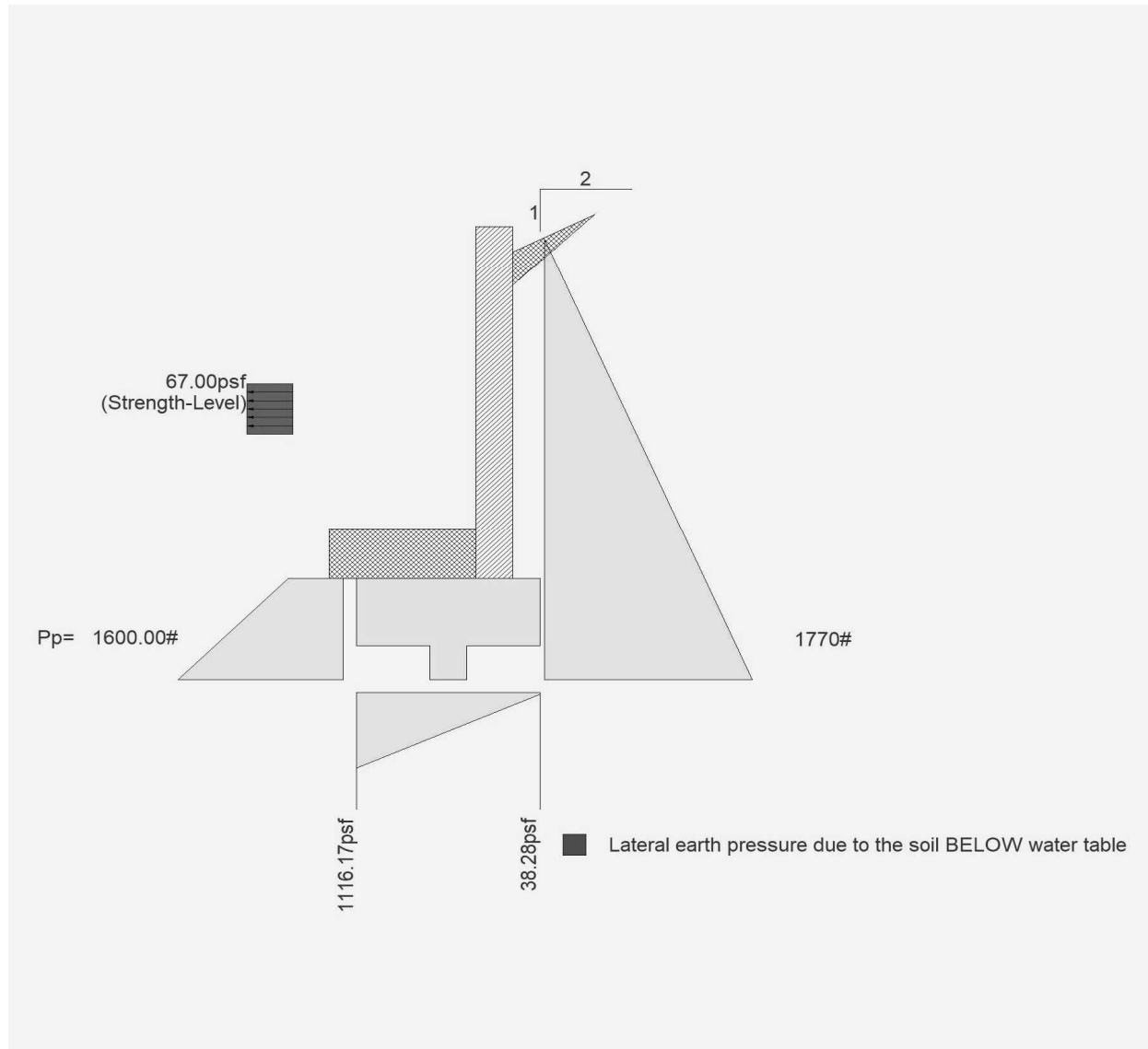
## Cantilevered Retaining Wall

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**DESCRIPTION: 5.5' WALL**

Project Title:  
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**BAKERSFIELD**  
 CONSULTING ENGINEERS

## Cantilevered Retaining Wall

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LIC# : KW-06015395, Build:20.22.10.25

PROVOST &amp; PRITCHARD ENGINEERING GROUP INC

(c) ENERCALC INC 1983-2022

**DESCRIPTION:** 7' WALL

### Code Reference:

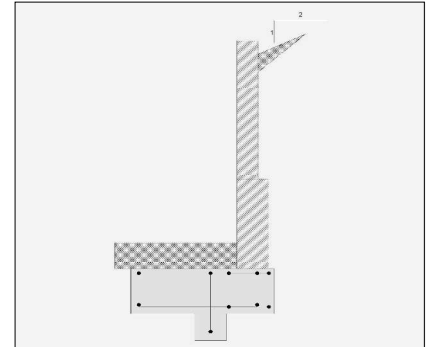
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

#### Criteria

Retained Height	=	8.00 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	2.00
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft

#### Soil Data

Allow Soil Bearing	=	2,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	45.0 psf/ft
	=	
Passive Pressure	=	400.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing  Soil Friction	=	0.450
Soil height to ignore for passive pressure	=	12.00 in



#### Surcharge Loads

Surcharge Over Heel	=	0.0 psf
NOT Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
NOT Used for Sliding & Overturning		

#### Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

#### Lateral Load Applied to Stem

Lateral Load	=	98.0 #/ft
...Height to Top	=	5.30 ft
...Height to Bottom	=	4.30 ft
Load Type	=	Seismic (E) (Strength Level)
Wind on Exposed Stem	=	0.0 psf (Strength Level)

#### Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type	=	Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Project Title:  
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BAKERSFIELD  
INCORPORATED

## Cantilevered Retaining Wall

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PROVOST &amp; PRITCHARD ENGINEERING GROUP INC

(c) ENERCALC INC 1983-2022

### DESCRIPTION: 7' WALL

Design Summary			Stem Construction		2nd	Bottom		
<b>Wall Stability Ratios</b>			<b>Design Height Above Ftc</b>	ft =	Stem OK	Ratio > 1.0		
Overturning	=	1.64 OK	Wall Material Above "Ht"	=	3.33	0.00		
Sliding	=	1.85 OK	Design Method	=	Masonry	Masonry		
Global Stability	=	1.45	Thickness	=	ASD	ASD	SD	SD
			Rebar Size	=	8.00	12.00		
			Rebar Spacing	=	# 5	# 6		
			Rebar Placed at	=	24.00	16.00		
Total Bearing Load	=	3,846 lbs		=	Center	7.63 i		
...resultant ecc.	=	6.06 in	<b>Design Data</b>					
Eccentricity within middle third			fb/FB + fa/Fa	=	0.968	1.098		
Soil Pressure @ Toe	=	1,056 psf OK	<b>Total Force @ Section</b>					
Soil Pressure @ Heel	=	206 psf OK	Service Level	lbs =	559.3	1,508.6		
Allowable	=	2,500 psf	Strength Level	lbs =				
Soil Pressure Less Than Allowable			<b>Moment....Actual</b>					
ACI Factored @ Toe	=	1,479 psf	Service Level	ft-# =	864.7	4,169.3		
ACI Factored @ Heel	=	288 psf	Strength Level	ft-# =				
Footing Shear @ Toe	=	9.4 psi OK	Moment....Allowable	ft-# =	892.9	3,794.2		
Footing Shear @ Heel	=	8.5 psi OK	<b>Shear.....Actual</b>					
Allowable	=	82.2 psi	Service Level	psi =	6.1	10.8		
			Strength Level	psi =				
<b>Sliding Calcs</b>			Shear.....Allowable	psi =	51.7	52.5		
Lateral Sliding Force	=	2,281.3 lbs	Anet (Masonry)	in2 =	91.50	139.50		
less 100% Passive Force	=	2,488.9 lbs	Wall Weight	psf =	84.0	133.0		
less 100% Friction Force	=	1,730.6 lbs	Rebar Depth 'd'	in =	3.81	7.63		
Added Force Req'd	=	0.0 lbs OK	<b>Masonry Data</b>					
....for 1.5 Stability	=	0.0 lbs OK	f'm	psi =	2,000	2,000		
Vertical component of active lateral soil pressure IS considered in the calculation of soil bearing pressures.			Fs	psi =	20,000	20,000		
<b>Load Factors</b>			Solid Grouting	=	Yes	Yes		
Building Code			Modular Ratio 'n'	=	16.11	16.11		
Dead Load		1.200	Equiv. Solid Thick.	in =	7.63	11.63		
Live Load		1.600	Masonry Block Type	=				
Earth, H		1.600	Masonry Design Method	=	ASD			
Wind, W		1.600	<b>Concrete Data</b>					
Seismic, E		1.000	f'c	psi =				
			Fy	psi =				

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PROVOST &amp; PRITCHARD ENGINEERING GROUP INC

(c) ENERCALC INC 1983-2022

### DESCRIPTION: 7' WALL

#### Footing Data

Toe Width	=	3.33 ft
Heel Width	=	1.17
Total Footing Width	=	4.50
Footing Thickness	=	20.00 in
Key Width	=	12.00 in
Key Depth	=	12.00 in
Key Distance from Toe	=	2.00 ft
f'c =	3,000 psi	Fy = 60,000 psi
Footing Concrete Density	=	150.00 pcf
Min. As %	=	0.0018
Cover @ Top	2.00	@ Btm.= 3.00 in

#### Footing Design Results

	Toe	Heel
Factored Pressure	= 1,479	288 psf
Mu' : Upward	= 6,568	4 ft-#
Mu' : Downward	= 2,755	345 ft-#
Mu: Design	= 3,813 OK	341 ft-# OK
phiMn	= 32,063	34,043 ft-#
Actual 1-Way Shear	= 9.45	8.52 psi
Allow 1-Way Shear	= 82.16	82.16 psi
Toe Reinforcing	= # 6 @ 12.00 in	
Heel Reinforcing	= # 6 @ 12.00 in	
Key Reinforcing	= # 6 @ 18.00 in	
Footing Torsion, Tu	=	0.00 ft-lbs
Footing Allow. Torsion, phi Tu	=	0.00 ft-lbs

**If torsion exceeds allowable, provide supplemental design for footing torsion.**

#### Other Acceptable Sizes & Spacings

Toe: #4@ 5.55 in, #5@ 8.61 in, #6@ 12.22 in, #7@ 16.66 in, #8@ 21.94 in, #9@ 27.77 in, #10@ 35.27 in

Heel: #4@ 5.55 in, #5@ 8.61 in, #6@ 12.22 in, #7@ 16.66 in, #8@ 21.94 in, #9@ 27.77 in, #10@ 35.27 in

Key: #4@ 9.25 in, #5@ 14.35 in, #6@ 18 in, #7@ 18

Min footing T&S reinf Area 1.94 in2  
 Min footing T&S reinf Area per foot 0.43 in2 /ft

#### If one layer of horizontal bars:

#4@ 5.56 in  
 #5@ 8.61 in  
 #6@ 12.22 in

#### If two layers of horizontal bars:

#4@ 11.11 in  
 #5@ 17.22 in  
 #6@ 24.44 in

Project Title:  
 Engineer:  
 Project ID:  
 Project Descr:

Project: 24-00008434

Date: 9/27/2024



## Cantilevered Retaining Wall

Project File: CITY VIEW.ec6

LIC# : KW-06015395, Build:20.22.10.25

PROVOST &amp; PRITCHARD ENGINEERING GROUP INC

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**DESCRIPTION: 7' WALL**

### Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING.....			.....RESISTING.....			
	Force lbs	Distance ft	Moment ft-#	Force lbs	Distance ft	Moment ft-#	
HL Act Pres (ab water tbl)	2,212.7	3.31	6,951.8	Soil Over HL (ab. water tbl)	147.0	4.41	648.6
HL Act Pres (be water tbl)				Soil Over HL (bel. water tbl)		4.41	648.6
Hydrostatic Force				Water Table			
Buoyant Force =				Sloped Soil Over Heel =	0.8	4.44	3.4
Surcharge over Heel =				Surcharge Over Heel =			
Surcharge Over Toe =				Adjacent Footing Load =			
Adjacent Footing Load =				Axial Dead Load on Stem =			
Added Lateral Load =	68.6	6.47	443.6	* Axial Live Load on Stem =			
Load @ Stem Above Soil =				Soil Over Toe =	366.3	1.67	609.9
				Surcharge Over Toe =			
				Stem Weight(s) =	877.2	3.75	3,287.2
				Earth @ Stem Transitions =	171.2	4.16	712.9
				Footing Weight =	1,124.3	2.25	2,527.9
				Key Weight =	150.0	2.50	375.0
				Vert. Component =	1,009.1	4.50	4,538.0
<b>Total</b>	= 2,281.3	<b>O.T.M.</b>	= 7,758.0	<b>Total =</b>	3,845.8 lbs	<b>R.M.=</b>	12,702.9
<b>Resisting/Overturning Ratio</b>		=	<b>1.64</b>	* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.			
Vertical Loads used for Soil Pressure =		3,845.8	lbs				

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS considered in the calculation of Overturning Resistance.

### Tilt

#### Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus 250.0 pci

Horizontal Defl @ Top of Wall (approximate only) 0.055 in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe.

because the wall would then tend to rotate into the retained soil.

Project Title:  
Engineer:  
Project ID:  
Project Descr:

## Cantilevered Retaining Wall

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**DESCRIPTION: 7' WALL**

### Rebar Lap & Embedment Lengths Information

#### Stem Design Segment: 2nd

Stem Design Height: 3.33 ft above top of footing

Calculated Rebar Stress,  $f_s$  = 19368.89 psi

Lap Splice length for #5 bar specified in this stem design segment =

36.32 in

Development length for #5 bar specified in this stem design segment =

36.32 in

---

#### Stem Design Segment: Bottom

Stem Design Height: 0.00 ft above top of footing

Calculated Rebar Stress,  $f_s$  = 21977.39 psi

Lap Splice length for #6 bar specified in this stem design segment =

49.45 in

Development length for #6 bar specified in this stem design segment =

49.45 in

Hooked embedment length into footing for #6 bar specified in this stem design segment =

7.67 in

As Provided =

0.3300 in<sup>2</sup>/ft

As Required =

0.3702 in<sup>2</sup>/ft

Project Title:  
Engineer:  
Project ID:  
Project Descr:

## Cantilevered Retaining Wall

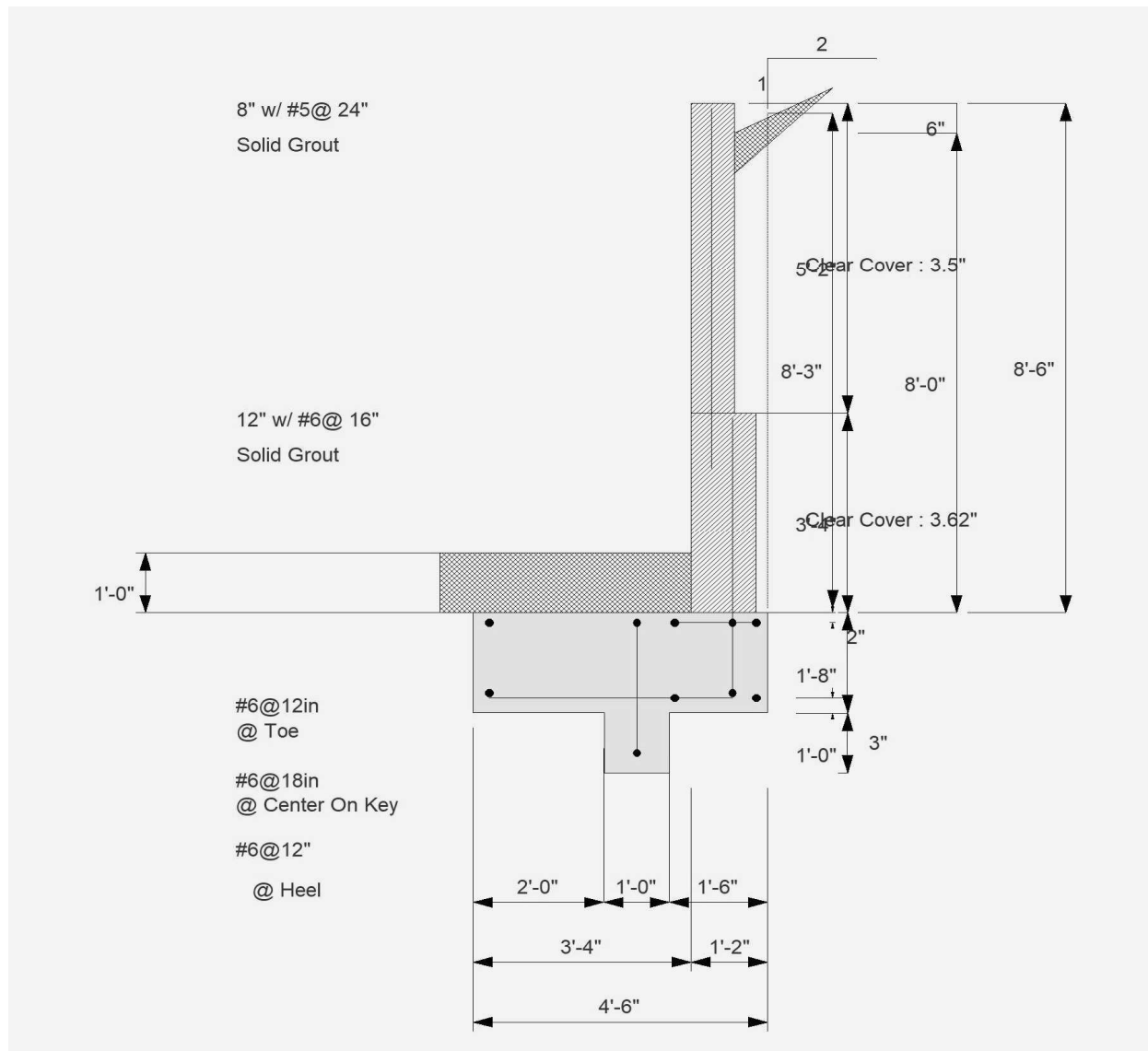
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LIC# : KW-06015395, Build:20.22.10.25

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**DESCRIPTION:** 7' WALL



Project Title:  
Engineer:  
Project ID:  
Project Descr:

Project: 24-00008434

Date: 9/27/2024

BAKERSFIELD  
ENGINEERING GROUP

## Cantilevered Retaining Wall

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**DESCRIPTION: 7' WALL**