CITY OF SACRAMENTO

1231 I Street, Sacramento, CA 95814

Permit No: 0504619
Insp Area: 3
Thos Bros: 318D1

Site Address: 3321 POWER INN RD SAC
Parcel No: 079-0430-002

Sub-Type: NOTHR
Housing (Y/N): N

CONTRACTOR
WEST FORK CONSTRUCTION
4701 24TH ST SUITE 1A
SACRAMENTO CA 95822

OWNER
REGIONAL PARK LIMITED -C
3321 POWER INN ROAD
SACRAMENTO, CA 95826

ARCHITECT
JTS ENGINEERING
1808 J ST
SACRAMENTO CA 95814

Nature of Work: NEW ONSITE DRIVEWAY , RETAINING WALL, LIGHT FIXTURE & LANDSCAPING

CONSTRUCTION LENDING AGENCY : I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C).

Lender's Name_____ Lender'sAddress_____

LICENSED CONTRACTORS DECLARATION: I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with section 7000) of Division 3 of the Business and Professions Code and my license is in full force and effect.

License Class_____ License Number 724016 Date 8/1/05 Contractor Signature_____

OWNER-BUILDER DECLARATION: I hereby affirm under penalty of perjury that I am exempt from the contractors License Law for the following reason (Sec. 7031.5, Business and Professions Code; any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 8 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars ($500.00);

_____ I, as a owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professional Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or herself or through his/her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he/she did not build or improve for the purpose of sale.)

_____ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law).

_____ I am exempt under Sec._____ B & PC for this reason:_____

Date_____ Owner Signature_____

CITY OF SAC PAID AUG 01 2005 NORTH DESK

IN ISSUING THIS BUILDING PERMIT, the applicant represents, and the city relies on the representation of the applicant, that the applicant verified all measurements and locations shown on the application or accompanying drawings and that the improvement to be constructed does not violate any law or private agreement relating to permissible or prohibited locations for such improvements. This building permit does not authorize any illegal location of any improvement or the violation of any private agreement relating to location of improvements.

I certify that I have read this application and state that all information is correct. I agree to comply with all city and county ordinances and state laws relating to building construction and herby authorize representative(s) of this city to enter upon the abovementioned property for inspection purposes.

Date 8/1/05 Applicant/Agent Signature_____

WORKER'S COMPENSATION DECLARATION: I hereby affirm under penalty of perjury one of the following declarations:
_____ I have and will maintain a certificate of consent to self-insure for workers' compensation as provided for by Section 3700 of the Labor Code, for the performance of work for which the permit is issued.

_____ I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are:

Carrier STATE FUND Policy Number 046001030703 Exp Date 01/01/2006

_____ (This section need not be completed if the permit is for $100 or less) I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the workers' compensation laws of California and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

Date 8/1/05 Applicant Signature_____

WARNING: FAILURE TO SECURE WORKER'S COMPENSATION COVERAGE IS UNLAWFUL AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS ($100,000) IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST AND ATTORNEY'S FEE.

~~THIS PERMIT SHALL EXPIRE BY LIMITATION IF WORK IS NOT COMMENCED WITHIN 180 DAYS.~~

WALLACE - KUHL
& ASSOCIATES INC.

Geotechnical Engineering
Engineering Geology
Environmental Consulting
Remediation Services
Construction Inspection
Materials Testing

June 16, 2006

Mr. Dain Dornich
Granite Park Partnership
3321 Power Inn Road, Suite 180
Sacramento, CA 95826

Special Inspection Final Report
GRANITE REGIONAL PARK
Permit No. 0504619
WKA No. 6808.01

In accordance with City of Sacramento special inspection requirements, our firm has performed *Special Inspection and Testing* in accordance with Sections 106 and 1701 of the Uniform Building Code for the subject project. Our observation and test results indicate that the following items were constructed, to the best of our knowledge, in accordance with the project's plans and specifications:

Concrete: Inspected placement of reinforcing steel and concrete for retaining wall footings and light pole bases. Obtained concrete samples for laboratory testing and performed slump tests. Performed laboratory compressive strength testing.

Masonry: Inspected placement of reinforcing steel and grout for 8" and 12" CMU walls. Monitored grout consistency and consolidation during placement. Obtained CMU block, grout and mortar samples for laboratory compressive strength testing.

Please note that mortar samples cast on September 12, 2005, which had low 28-day compressive strength values, broke in a non-standard manner. Integrated Design Group prepared calculations incorporating the average 28-day mortar compressive strength of 1380 pounds per square inch and determined the subject retaining wall capacities are adequate. The mortar compression test report and detailed wall design calculations are attached.

Last date on jobsite: March 27, 2006.

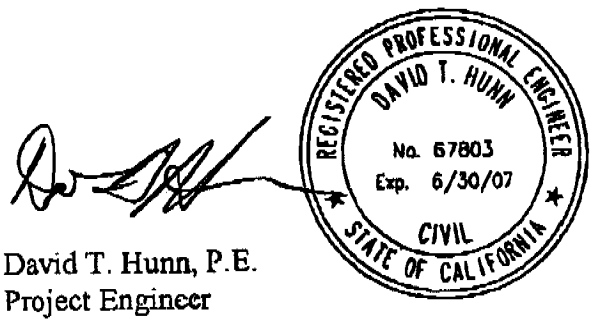
CORPORATE OFFICE
3050 Industrial Boulevard
West Sacramento
CA 95691
Tel 916.372.1434
Fax 916.372.2565

ROCKLIN OFFICE
500 Menlo Drive
Suite 100
Rocklin, CA 95765
Tel 916.435.9722
Fax 916.435.9822

STOCKTON OFFICE
3410 West Hammer Lane
Suite F
Stockton, CA 95219
Tel 209.234.7722
Fax 209.234.7727

Please contact our office if you have any questions regarding this information.

Wallace - Kuhl & Associates, Inc.



David T. Hunn, P.E.
Project Engineer

Attachments: Integrated Design Group Memo including Mortar Compression Test Report and Cantilevered Retaining Wall Design Calculations

cc: (1) West Fork Construction
(1) City of Sacramento

INTEGRATED DESIGN GROUP

STRUCTURAL ENGINEERING

9700 BUSINESS PARK DRIVE, SUITE 301, Sacramento, California 95827
916-363-7222, Fax 916-363-0387

Memo

To: Ken Ewert

Westfork Construction

4701 24th Street

Sacramento, CA 95822

From: Gerardo V. Calvillo, Jr.

Date: 6-14-06

Re: East Cucamonga Retaining Walls

On June 9, 2006 Integrated Design Group received a Compression Test Report prepared by Walllace-Kuhl & Associates for the MORTAR material installed at the 12" and 8" inch thick Concrete Masonry Wall at Station 8+50. The Test Report indicates that the compression strength available is 1380 psi which is less than the specified design strength of1800 psi.

Integrated Design Group has prepared the attached calculations incorporating the 1380 psi mortar strength and has determined that the subject retaining wall capacities are adequate.

Conclusion: The subject Concrete Masonry Walls with a MORTAR strength of 1380 psi are adequate.

Refer to attachments:

- Wallace-Kuhl & Associates MORTAR Strength Compression Test Report.
- Retaining Wall Calculations with Mortar strength at 1380 psi.

WALLACE · KUHL & ASSOCIATES INC

Geotechnical Engineering
Engineering Geology
Environmental Consulting
Remediation Services
Construction Inspection
Materials Testing

Facsimile Transmittal Sheet

DATE AND TIME: 6/9/06 @ 12PM

TO: Gerardo Calvino

COMPANY: Integrated Design Group

FAX NUMBER: 363-0387

FROM: David Hunn

SUBJECT: Granite Regional Park - Low Mortar Compression Test Results

NUMBER OF PAGES TO FOLLOW: 1 **WKA NO:** 6808.01

ORIGINAL DOCUMENT:
- ____ Will Follow via Regular Mail
- ____ Will Follow via Express Delivery
- X Will Not Follow
- ____ Other ____

COMMENTS:

Please call with any questions regarding the report.

DTH

☒ **Corporate Office**
3050 Industrial Blvd.
West Sacramento
CA 95691
Tel 916.372.1434
Fax 916.372.2565

☐ **Rocklin Office**
500 Menlo Drive,
Suite 100
Rocklin, CA 95765
Tel 916.435.9722
Fax 916.435.9822

☐ **Stockton Office**
3410 W. Hammer Lane
Suite F
Stockton, CA 95219
Tel 209.234.7722
Fax 209.234.7727

IF THERE ARE ANY PROBLEMS WITH THIS TRANSMISSION, PLEASE CALL OUR OFFICE
916-372-1434
THANK YOU

WALLACE - KUHL & ASSOCIATES
WALLACE-KUHL & ASSOCIATES, INC.
3050 Indu ...levard
West Sacr...., CA 95691
Phone: (916) 372-1434
Fax: (916) 372-2565

COMPRESSION TEST REPORT

Report to: GRANITE PARK PARTNERSHIP
ATTN: DAIN DOMICH
3321 POWER INN RD, #180
SACRAMENTO, CA 95826

Date: 10/14/05

WKA Project No.: 6808.01

Project Name:
GRANITE REGIONAL PARK
SACRAMENTO, CALIFORNIA
PERMIT NO: 0504619

Mix Design No.: TYPE S

Supplier: DRY MIX

Design Strength: 1,800 psi
Design Age: 28 days
Specimen: MORTAR

Air Content:

Location in Structure:
12"/8" CMU WALL, STATION 8+50

Mix Temp. 81 °F Air Temp. 75 °F

SPECIMEN LAB NO.	7736	7737	7738
Date Cast	9/12/05	9/12/05	9/12/05
Date Received	9/13/05	9/13/05	9/13/05
Date Tested	9/20/05	10/10/05	10/10/05
Age at Test, days	8	28	28
Diameter, in.	2.00	2.00	2.00
Height, in.	4.0	4.0	4.0
Area, sq. inches	3.14	3.14	3.14
Ult. Load, lbs.	4510	4500	4320
Comp. Str., psi	1440	1430	1380
Fracture Type	1	5	5

Note: The 28-day cylinders broke in a non-standard manner.

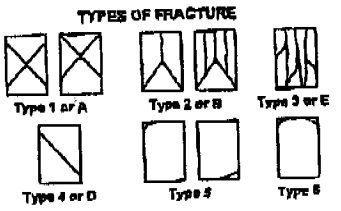
Test results may not reflect in-place mortar strength.

Average strength: 1410 psi at 28 days

☐ Meets 28 day strength req. ☒ Fails to Meet 28 day str. req. ☐ No strength req. given ☒ Cast by WKA ☐ Cast by others

Remarks:

TYPES OF FRACTURE



Copies to:
WEST FORK CONSTRUCTION
CITY OF SACRAMENTO

Reviewed by: DTH
Dave T. Hunn

TEST METHODS: Compressive Strength - ASTM C39,
Air Content - ASTM C173 or C231

Title : Frontage Improvements Job # 012-005
Dsgnr: Anthony E. Johnson Date: 1:03PM, 9 JUN 06
Description : Retaining Wall Design

Scope :

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Cantilevered Retaining Wall Design

Description Masonry Wall @ 6'-0"< H < 8'-0"

Criteria

Retained Height	=	8.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	2.00 : 1
Height of Soil over Toe	=	12.00 in
Soil Density	=	110.00 pcf
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	1,800.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	55.0 psf/ft
Toe Active Pressure	=	55.0 psf/ft
Passive Pressure	=	300.0 psf/ft
Water height over heel	=	0.0 ft
Footing||Soil Friction	=	0.250
Soil height to ignore for passive pressure	=	12.00 in

Footing Strengths & Dimensions

f'c = 2,500 psi Fy = 60,000 psi

Min. As %	=	0.0015
Toe Width	=	2.00 ft
Heel Width	=	4.00
Total Footing Width	=	6.00
Footing Thickness	=	15.00 in
Key Width	=	12.00 in
Key Depth	=	36.00 in
Key Distance from Toe	=	2.00 ft

Cover @ Top = 2.00 in @ Btm.= 3.00 in

Design Summary

Total Bearing Load	=	7,765 lbs
...resultant ecc.	=	2.62 in
Soil Pressure @ Toe	=	1,577 psf OK
Soil Pressure @ Heel	=	1,012 psf OK
Allowable	=	1,800 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	1,561 psf
ACI Factored @ Heel	=	1,002 psf
Footing Shear @ Toe	=	15.2 psi OK
Footing Shear @ Heel	=	56.3 psi OK
Allowable	=	85.0 psi
Wall Stability Ratios		
Overturning	=	2.90 OK
Sliding	=	1.56 (Vertical Co
Sliding Calcs (Vertical Component Used)		
Lateral Sliding Force	=	3,178.0 lbs
less 100% Passive Force	= -	3,984.4 lbs
less 50 % Friction Force	= -	970.6 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Stem Construction

		Top Stem	2nd
Design height	ft =	Stem OK 4.00	Stem OK 0.00
Wall Material Above "Ht"	=	Masonry	Masonry
Thickness	=	8.00	12.00
Rebar Size	=	# 4	# 6
Rebar Spacing	=	16.00	16.00
Rebar Placed at	=	Edge	Edge
Design Data			
fb/FB + fa/Fa	=	0.415	0.888
Total Force @ Section	lbs =	440.0	1,732.5
Moment....Actual	ft-# =	586.7	4,684.2
Moment.....Allowable	ft-# =	1,415.1	5,272.8
Shear.....Actual	psi =	7.7	18.0
Shear.....Allowable	psi =	37.1	37.1
Bar Develop ABOVE Ht.	in =	24.00	36.00
Bar Lap/Hook BELOW Ht.	in =	24.00	11.19
Wall Weight	psf =	78.0	124.0
Rebar Depth 'd'	in =	5.25	9.00
Masonry Data			
f'm	psi =	1,380	1,380
Fs	psi =	24,000	24,000
Solid Grouting	=	Yes	Yes
Special Inspection	=	Yes	Yes
Modular Ratio 'n'	=	28.02	28.02
Short Term Factor	=	1.000	1.000
Equiv. Solid Thick.	in =	7.60	11.62
Masonry Block Type = Medium Weight			
Concrete Data			
f'c	psi =		
Fy	psi =		

Other Acceptable Sizes & Spacings
Toe: Not req'd, Mu < S * Fr
Heel: #4@ 5.25 in, #5@ 8.00 in, #6@ 11.25 in, #7@ 15.25 in, #8@ 20.00 in, #9@ 25.
Key: #4@ 15.00 in, #5@ 23.00 in, #6@ 32.

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,561	1,002 psf
Mu' : Upward	=	3,774	0 ft-#
Mu' : Downward	=	1,054	19,438 ft-#
Mu: Design	=	2,719	19,438 ft-#
Actual 1-Way Shear	=	15.23	56.32 psi
Allow 1-Way Shear	=	85.00	85.00 psi
Toe Reinforcing	=	# 5 @ 16.00 in	
Heel Reinforcing	=	# 5 @ 16.00 in	
Key Reinforcing	=	# 5 @ 16.00 in	

Cantilevered Retaining Wall Design

Description Masonry Wall @ 6'-0"< H < 8'-0"

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING.....		
Item		**Force** lbs	**Distance** ft	**Moment** ft-#
Heel Active Pressure	=	3,178.0	3.58	11,387.7
Toe Active Pressure	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
SeismicLoad	=			
Total	=	3,178.0	**O.T.M.** =	11,387.7

Resisting/Overturning Ratio = **2.90**

Vertical Loads used for Soil Pressure = 7,765.1 lbs

Vertical component of active pressure used for soil pressure

		.....RESISTING.....		
		Force lbs	**Distance** ft	**Moment** ft-#
Soil Over Heel	=	2,640.0	4.50	11,880.0
Sloped Soil Over Heel	=	247.5	5.00	1,237.5
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=	220.0	1.00	220.0
Surcharge Over Toe	=			
Stem Weight(s)	=	808.0	2.44	1,968.0
Earth @ Stem Transitions	=	146.7	2.83	415.6
Footing Weight	=	1,125.0	3.00	3,375.0
Key Weight	=	450.0	2.50	1,125.0
Vert. Component	=	2,127.9	6.00	12,767.4
Total =		7,765.1	lbs **R.M.=**	32,988.5

Cantilevered Retaining Wall Design

Description Masonry Wall @ 6'-0"< H < 8'-0"

Criteria

Retained Height	=	8.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	2.00 : 1
Height of Soil over Toe	=	12.00 in
Soil Density	=	110.00 pcf
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	1,800.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	55.0 psf/ft
Toe Active Pressure	=	55.0 psf/ft
Passive Pressure	=	300.0 psf/ft
Water height over heel	=	0.0 ft
Footing||Soil Friction	=	0.250
Soil height to ignore for passive pressure	=	12.00 in

Footing Strengths & Dimensions

f'c = 2,500 psi	Fy =	60,000 psi
Min. As %	=	0.0015
Toe Width	=	2.00 ft
Heel Width	=	4.00
Total Footing Width	=	6.00
Footing Thickness	=	15.00 in
Key Width	=	12.00 in
Key Depth	=	36.00 in
Key Distance from Toe	=	2.00 ft
Cover @ Top = 2.00 in	@ Btm.=	3.00 in

Design Summary

Total Bearing Load	=	7,765 lbs
...resultant ecc.	=	2.62 in
Soil Pressure @ Toe	=	1,577 psf OK
Soil Pressure @ Heel	=	1,012 psf OK
Allowable	=	1,800 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	1,561 psf
ACI Factored @ Heel	=	1,002 psf
Footing Shear @ Toe	=	15.2 psi OK
Footing Shear @ Heel	=	56.3 psi OK
Allowable	=	85.0 psi
Wall Stability Ratios		
Overturning	=	2.90 OK
Sliding	=	1.56 (Vertical Co

Sliding Calcs (Vertical Component Used)

Lateral Sliding Force	=	3,178.0 lbs
less 100% Passive Force	= -	3,984.4 lbs
less 50 % Friction Force	= -	970.6 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,561	1,002 psf
Mu' : Upward	=	3,774	0 ft-#
Mu' : Downward	=	1,054	19,438 ft-#
Mu: Design	=	2,719	19,438 ft-#
Actual 1-Way Shear	=	15.23	56.32 psi
Allow 1-Way Shear	=	85.00	85.00 psi
Toe Reinforcing	=	# 5 @ 16.00 in	
Heel Reinforcing	=	# 5 @ 16.00 in	
Key Reinforcing	=	# 5 @ 16.00 in	

Stem Construction

		Top Stem	2nd
		Stem OK	Stem OK
Design height	ft =	4.00	0.00
Wall Material Above "Ht"	=	Masonry	Masonry
Thickness	=	8.00	12.00
Rebar Size	=	# 4	# 6
Rebar Spacing	=	16.00	16.00
Rebar Placed at	=	Edge	Edge
Design Data			
fb/FB + fa/Fa	=	0.415	0.885
Total Force @ Section	lbs =	440.0	1,732.5
Moment....Actual	ft-# =	586.7	4,684.2
Moment.....Allowable	ft-# =	1,415.1	5,294.8
Shear.....Actual	psi =	7.7	17.9
Shear.....Allowable	psi =	37.1	38.7
Bar Develop ABOVE Ht.	in =	24.00	36.00
Bar Lap/Hook BELOW Ht.	in =	24.00	11.15
Wall Weight	psf =	78.0	124.0
Rebar Depth 'd'	in =	5.25	9.00
Masonry Data			
f'm	psi =	1,380	1,500
Fs	psi =	24,000	24,000
Solid Grouting	=	Yes	Yes
Special Inspection	=	Yes	Yes
Modular Ratio 'n'	=	28.02	25.78
Short Term Factor	=	1.000	1.000
Equiv. Solid Thick.	in =	7.60	11.62
Masonry Block Type = Medium Weight			
Concrete Data			
f'c	psi =		
Fy	psi =		

Other Acceptable Sizes & Spacings
Toe: Not req'd, Mu < S * Fr
Heel: #4@ 5.25 in, #5@ 8.00 in, #6@ 11.25 in, #7@ 15.25 in, #8@ 20.00 in, #9@ 25.
Key: #4@ 15.00 in, #5@ 23.00 in, #6@ 32.

Cantilevered Retaining Wall Design

Description Masonry Wall @ 6'-0"< H < 8'-0"

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	3,178.0	3.58	11,387.7
Toe Active Pressure	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
SeismicLoad	=			
Total	=	3,178.0	**O.T.M.** =	11,387.7

Resisting/Overturning Ratio = **2.90**

Vertical Loads used for Soil Pressure = 7,765.1 lbs

Vertical component of active pressure used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	2,640.0	4.50	11,880.0
Sloped Soil Over Heel	=	247.5	5.00	1,237.5
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=	220.0	1.00	220.0
Surcharge Over Toe	=			
Stem Weight(s)	=	808.0	2.44	1,968.0
Earth @ Stem Transitions	=	146.7	2.83	415.6
Footing Weight	=	1,125.0	3.00	3,375.0
Key Weight	=	450.0	2.50	1,125.0
Vert. Component	=	2,127.9	6.00	12,767.4
Total	=	7,765.1 lbs	**R.M.**=	32,988.5

Cantilevered Retaining Wall Design

Description Masonry Wall @ 4'-0"< H < 6'-0"

Criteria

Retained Height	=	6.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	2.00 : 1
Height of Soil over Toe	=	12.00 in
Soil Density	=	110.00 pcf
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	1,800.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	55.0 psf/ft
Toe Active Pressure	=	55.0 psf/ft
Passive Pressure	=	300.0 psf/ft
Water height over heel	=	0.0 ft
Footing||Soil Friction	=	0.250
Soil height to ignore for passive pressure	=	12.00 in

Footing Strengths & Dimensions

f'c = 2,500 psi	Fy =	60,000 psi
Min. As %	=	0.0015
Toe Width	=	1.50 ft
Heel Width	=	3.50
Total Footing Width	=	5.00
Footing Thickness	=	15.00 in
Key Width	=	12.00 in
Key Depth	=	24.00 in
Key Distance from Toe	=	1.50 ft
Cover @ Top = 2.00 in	@ Btm.=	3.00 in

Design Summary

Total Bearing Load	=	5,344 lbs
...resultant ecc.	=	2.00 in
Soil Pressure @ Toe	=	1,283 psf OK
Soil Pressure @ Heel	=	855 psf OK
Allowable	=	1,800 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	1,331 psf
ACI Factored @ Heel	=	887 psf
Footing Shear @ Toe	=	9.2 psi OK
Footing Shear @ Heel	=	40.1 psi OK
Allowable	=	85.0 psi
Wall Stability Ratios		
Overturning	=	3.09 OK
Sliding	=	1.56 (Vertical Co
Sliding Calcs (Vertical Component Used)		
Lateral Sliding Force	=	2,065.6 lbs
less 100% Passive Force	= -	2,559.4 lbs
less 50 % Friction Force	= -	668.0 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,331	887 psf
Mu' : Upward	=	1,780	0 ft-#
Mu' : Downward	=	578	12,585 ft-#
Mu: Design	=	1,202	12,585 ft-#
Actual 1-Way Shear	=	9.22	40.15 psi
Allow 1-Way Shear	=	85.00	85.00 psi
Toe Reinforcing	=	# 5 @ 16.00 in	
Heel Reinforcing	=	# 5 @ 16.00 in	
Key Reinforcing	=	None Spec'd	

Stem Construction

		Top Stem	2nd
		Stem OK	Stem OK
Design height	ft =	2.00	0.00
Wall Material Above "Ht"	=	Masonry	Masonry
Thickness	=	8.00	8.00
Rebar Size	=	# 4	# 6
Rebar Spacing	=	16.00	16.00
Rebar Placed at	=	Edge	Edge
Design Data			
fb/FB + fa/Fa	=	0.413	0.879
Total Force @ Section	lbs =	440.0	962.5
Moment....Actual	ft-# =	586.7	1,970.8
Moment.....Allowable	ft-# =	1,420.5	2,242.2
Shear.....Actual	psi =	7.7	17.6
Shear.....Allowable	psi =	38.7	37.1
Bar Develop ABOVE Ht.	in =	24.00	36.00
Bar Lap/Hook BELOW Ht.	in =	24.00	8.32
Wall Weight	psf =	78.0	78.0
Rebar Depth 'd'	in =	5.25	5.25
Masonry Data			
f'm	psi =	1,500	1,380
Fs	psi =	24,000	24,000
Solid Grouting	=	Yes	Yes
Special Inspection	=	Yes	Yes
Modular Ratio 'n'	=	25.78	28.02
Short Term Factor	=	1.000	1.000
Equiv. Solid Thick.	in =	7.60	7.60
Masonry Block Type = Medium Weight			
Concrete Data			
f'c	psi =		
Fy	psi =		

Other Acceptable Sizes & Spacings
Toe: Not req'd, Mu < S * Fr
Heel: #4@ 8.00 in, #5@ 12.25 in, #6@ 17.50 in, #7@ 23.75 in, #8@ 31.25 in, #9@ 39
Key: #4@ 15.00 in, #5@ 23.00 in, #6@ 32.

Cantilevered Retaining Wall Design

Description Masonry Wall @ 4'-0"< H < 6'-0"

Summary of Overturning & Resisting Forces & Moments

.....OVERTURNING.....

Item		Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	2,065.6	2.89	5,967.2
Toe Active Pressure	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
SeismicLoad	=			
Total	=	2,065.6	**O.T.M.** =	5,967.2

Resisting/Overturning Ratio = **3.09**

Vertical Loads used for Soil Pressure = 5,344.3 lbs

Vertical component of active pressure used for soil pressure

.....RESISTING.....

		Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	1,870.0	3.58	6,700.8
Sloped Soil Over Heel	=	220.8	4.06	895.3
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=	165.0	0.75	123.8
Surcharge Over Toe	=			
Stem Weight(s)	=	468.0	1.83	858.0
Earth @ Stem Transitions	=			
Footing Weight	=	937.5	2.50	2,343.7
Key Weight	=	300.0	2.00	600.0
Vert. Component	=	1,383.1	5.00	6,915.3
Total =		5,344.3 lbs	**R.M.=**	18,436.9

Title : Frontage Improvements **Job #** 012-005
Dsgnr: Anthony E. Johnson **Date:** 1:03PM, 9 JUN 06
Description : Retaining Wall Design

Scope :

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Cantilevered Retaining Wall Design

Description Masonry Wall @ 4'-0"< H < 6'-0"

Criteria

Retained Height	=	6.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	2.00 : 1
Height of Soil over Toe	=	12.00 in
Soil Density	=	110.00 pcf
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	1,800.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	55.0 psf/ft
Toe Active Pressure	=	55.0 psf/ft
Passive Pressure	=	300.0 psf/ft
Water height over heel	=	0.0 ft
Footing||Soil Friction	=	0.250
Soil height to ignore for passive pressure	=	12.00 in

Footing Strengths & Dimensions

f'c = 2,500 psi Fy = 60,000 psi

Min. As %	=	0.0015
Toe Width	=	1.50 ft
Heel Width	=	3.50
Total Footing Width	=	5.00
Footing Thickness	=	15.00 in
Key Width	=	12.00 in
Key Depth	=	24.00 in
Key Distance from Toe	=	1.50 ft

Cover @ Top = 2.00 in @ Btm.= 3.00 in

Design Summary

Total Bearing Load	=	5,344 lbs
...resultant ecc.	=	2.00 in
Soil Pressure @ Toe	=	1,283 psf OK
Soil Pressure @ Heel	=	855 psf OK
Allowable	=	1,800 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	1,331 psf
ACI Factored @ Heel	=	887 psf
Footing Shear @ Toe	=	9.2 psi OK
Footing Shear @ Heel	=	40.1 psi OK
Allowable	=	85.0 psi
Wall Stability Ratios		
Overturning	=	3.09 OK
Sliding	=	1.56 (Vertical Co
Sliding Calcs (Vertical Component Used)		
Lateral Sliding Force	=	2,065.6 lbs
less 100% Passive Force	= -	2,559.4 lbs
less 50 % Friction Force	= -	668.0 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Stem Construction

		Top Stem	2nd
		Stem OK	Stem OK
Design height	ft =	2.00	0.00
Wall Material Above "Ht"	=	Masonry	Masonry
Thickness	=	8.00	8.00
Rebar Size	=	# 4	# 6
Rebar Spacing	=	16.00	16.00
Rebar Placed at	=	Edge	Edge
Design Data			
fb/FB + fa/Fa	=	0.413	0.830
Total Force @ Section	lbs =	440.0	962.5
Moment....Actual	ft-# =	586.7	1,970.8
Moment.....Allowable	ft-# =	1,420.5	2,374.3
Shear.....Actual	psi =	7.7	17.5
Shear.....Allowable	psi =	38.7	38.7
Bar Develop ABOVE Ht.	in =	24.00	36.00
Bar Lap/Hook BELOW Ht.	in =	24.00	8.28
Wall Weight	psf =	78.0	78.0
Rebar Depth 'd'	in =	5.25	5.25
Masonry Data			
f'm	psi =	1,500	1,500
Fs	psi =	24,000	24,000
Solid Grouting	=	Yes	Yes
Special Inspection	=	Yes	Yes
Modular Ratio 'n'	=	25.78	25.78
Short Term Factor	=	1.000	1.000
Equiv. Solid Thick.	in =	7.60	7.60

Masonry Block Type = Medium Weight

Concrete Data

f'c	psi =
Fy	psi =

Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr
Heel: #4@ 8.00 in, #5@ 12.25 in, #6@ 17.50 in, #7@ 23.75 in, #8@ 31.25 in, #9@ 39
Key: #4@ 15.00 in, #5@ 23.00 in, #6@ 32.

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,331	887 psf
Mu' : Upward	=	1,780	0 ft-#
Mu' : Downward	=	578	12,585 ft-#
Mu: Design	=	1,202	12,585 ft-#
Actual 1-Way Shear	=	9.22	40.15 psi
Allow 1-Way Shear	=	85.00	85.00 psi
Toe Reinforcing	=	# 5 @ 16.00 in	
Heel Reinforcing	=	# 5 @ 16.00 in	
Key Reinforcing	=	None Spec'd	

Cantilevered Retaining Wall Design

Description Masonry Wall @ 4'-0"< H < 6'-0"

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING.....		
Item		**Force** lbs	**Distance** ft	**Moment** ft-#
Heel Active Pressure	=	2,065.6	2.89	5,967.2
Toe Active Pressure	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
SeismicLoad	=			
Total	=	2,065.6	**O.T.M.** =	5,967.2

Resisting/Overturning Ratio = **3.09**

Vertical Loads used for Soil Pressure = 5,344.3 lbs

Vertical component of active pressure used for soil pressure

		.....RESISTING.....		
		Force lbs	**Distance** ft	**Moment** ft-#
Soil Over Heel	=	1,870.0	3.58	6,700.8
Sloped Soil Over Heel	=	220.8	4.06	895.3
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=	165.0	0.75	123.8
Surcharge Over Toe	=			
Stem Weight(s)	=	468.0	1.83	858.0
Earth @ Stem Transitions	=			
Footing Weight	=	937.5	2.50	2,343.7
Key Weight	=	300.0	2.00	600.0
Vert. Component	=	1,383.1	5.00	6,915.3
	Total =	5,344.3	lbs **R.M.=**	18,436.9

Title : Frontage Improvements **Job #** 012-005
Dsgnr: Anthony E. Johnson **Date:** 1:04PM, 9 JUN 06
Description : Retaining Wall Design

Scope :

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Cantilevered Retaining Wall Design

Description Masonry Wall @ 2'-0"< H < 4'-0"

Criteria

Retained Height	=	4.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	2.00 : 1
Height of Soil over Toe	=	12.00 in
Soil Density	=	110.00 pcf
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	1,800.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	55.0 psf/ft
Toe Active Pressure	=	55.0 psf/ft
Passive Pressure	=	300.0 psf/ft
Water height over heel	=	0.0 ft
Footing||Soil Friction	=	0.300
Soil height to ignore for passive pressure	=	12.00 in

Footing Strengths & Dimensions

f'c = 2,500 psi Fy = 60,000 psi

Min. As %	=	0.0015
Toe Width	=	1.00 ft
Heel Width	=	2.50
Total Footing Width	=	3.50
Footing Thickness	=	15.00 in
Key Width	=	12.00 in
Key Depth	=	12.00 in
Key Distance from Toe	=	1.00 ft

Cover @ Top = 2.00 in @ Btm.= 3.00 in

Design Summary

Total Bearing Load	=	2,828 lbs
...resultant ecc.	=	1.92 in
Soil Pressure @ Toe	=	1,029 psf OK
Soil Pressure @ Heel	=	587 psf OK
Allowable	=	1,800 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	1,084 psf
ACI Factored @ Heel	=	618 psf
Footing Shear @ Toe	=	4.4 psi OK
Footing Shear @ Heel	=	19.5 psi OK
Allowable	=	85.0 psi
Wall Stability Ratios		
Overturning	=	3.09 OK
Sliding	=	1.78 (Vertical Co
Sliding Calcs (Vertical Component Used)		
Lateral Sliding Force	=	1,045.8 lbs
less 100% Passive Force	= -	1,434.4 lbs
less 50 % Friction Force	= -	424.1 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Stem Construction — Top Stem

Design height	ft =	Stem OK 0.00
Wall Material Above "Ht"	=	Masonry
Thickness	=	8.00
Rebar Size	=	# 4
Rebar Spacing	=	24.00
Rebar Placed at	=	Edge
Design Data		
fb/FB + fa/Fa	=	0.602
Total Force @ Section	lbs =	412.5
Moment....Actual	ft-# =	577.5
Moment.....Allowable	=	960.0
Shear.....Actual	psi =	7.1
Shear.....Allowable	psi =	37.1
Bar Develop ABOVE Ht.	in =	24.00
Bar Lap/Hook BELOW Ht.	in =	6.00
Wall Weight	=	78.0
Rebar Depth 'd'	in =	5.25
Masonry Data		
f'm	psi =	1,380
Fs	psi =	24,000
Solid Grouting	=	Yes
Special Inspection	=	Yes
Modular Ratio 'n'	=	28.02
Short Term Factor	=	1.000
Equiv. Solid Thick.	in =	7.60
Masonry Block Type = Medium Weight		
Concrete Data		
f'c	psi =	
Fy	psi =	

Other Acceptable Sizes & Spacings
Toe: Not req'd, Mu < S * Fr
Heel: #4@ 10.75 in, #5@ 16.75 in, #6@ 23.50 in, #7@ 32.25 in, #8@ 42.25 in, #9@ 4
Key: Not req'd, Mu < S * Fr

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,084	618 psf
Mu' : Upward	=	702	0 ft-#
Mu' : Downward	=	283	4,098 ft-#
Mu: Design	=	419	4,098 ft-#
Actual 1-Way Shear	=	4.35	19.54 psi
Allow 1-Way Shear	=	85.00	85.00 psi
Toe Reinforcing	=	# 4 @ 16.00 in	
Heel Reinforcing	=	# 4 @ 16.00 in	
Key Reinforcing	=	None Spec'd	

Cantilevered Retaining Wall Design

Description Masonry Wall @ 2'-0"< H < 4'-0"

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	1,045.8	2.06	2,149.6
Toe Active Pressure	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
SeismicLoad	=			
Total	=	1,045.8	**O.T.M.** =	2,149.6

Resisting/Overturning Ratio = **3.09**

Vertical Loads used for Soil Pressure = 2,827.6 lbs

Vertical component of active pressure used for soil pressure

Item		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	806.7	2.58	2,083.9
Sloped Soil Over Heel	=	92.4	2.89	267.0
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=	110.0	0.50	55.0
Surcharge Over Toe	=			
Stem Weight(s)	=	312.0	1.33	416.0
Earth @ Stem Transitions	=			
Footing Weight	=	656.2	1.75	1,148.4
Key Weight	=	150.0	1.50	225.0
Vert. Component	=	700.2	3.50	2,450.8
	Total =	2,827.6	lbs **R.M.=**	6,646.1

Title : Frontage Improvements **Job #** 012-005
Dsgnr: Anthony E. Johnson **Date:** 1:04PM, 9 JUN 06
Description : Retaining Wall Design

Scope :

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Cantilevered Retaining Wall Design

Description Masonry Wall @ 2'-0"< H < 4'-0"

Criteria

Retained Height	=	4.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	2.00 : 1
Height of Soil over Toe	=	12.00 in
Soil Density	=	110.00 pcf
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	1,800.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	55.0 psf/ft
Toe Active Pressure	=	55.0 psf/ft
Passive Pressure	=	300.0 psf/ft
Water height over heel	=	0.0 ft
Footing||Soil Friction	=	0.300
Soil height to Ignore for passive pressure	=	12.00 in

Footing Strengths & Dimensions

f'c = 2,500 psi Fy = 60,000 psi

Min. As %	=	0.0015
Toe Width	=	1.00 ft
Heel Width	=	2.50
Total Footing Width	=	3.50
Footing Thickness	=	15.00 in
Key Width	=	12.00 in
Key Depth	=	12.00 in
Key Distance from Toe	=	1.00 ft

Cover @ Top = 2.00 in @ Btm.= 3.00 in

Design Summary

Total Bearing Load	=	2,828 lbs
...resultant ecc.	=	1.92 in
Soil Pressure @ Toe	=	1,029 psf OK
Soil Pressure @ Heel	=	587 psf OK
Allowable	=	1,800 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	1,084 psf
ACI Factored @ Heel	=	618 psf
Footing Shear @ Toe	=	4.4 psi OK
Footing Shear @ Heel	=	19.5 psi OK
Allowable	=	85.0 psi
Wall Stability Ratios		
Overturning	=	3.09 OK
Sliding	=	1.78 (Vertical Co
Sliding Calcs (Vertical Component Used)		
Lateral Sliding Force	=	1,045.8 lbs
less 100% Passive Force	= -	1,434.4 lbs
less 50 % Friction Force	= -	424.1 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Stem Construction

Top Stem

Stem OK

Design height	ft =	0.00
Wall Material Above "Ht"	=	Masonry
Thickness	=	8.00
Rebar Size	=	# 4
Rebar Spacing	=	24.00
Rebar Placed at	=	Edge
Design Data		
fb/FB + fa/Fa	=	0.600
Total Force @ Section	lbs =	412.5
Moment....Actual	ft-# =	577.5
Moment.....Allowable	=	963.2
Shear.....Actual	psi =	7.1
Shear.....Allowable	psi =	38.7
Bar Develop ABOVE Ht.	in =	24.00
Bar Lap/Hook BELOW Ht.	in =	6.00
Wall Weight	=	78.0
Rebar Depth 'd'	in =	5.25
Masonry Data		
f'm	psi =	1,500
Fs	psi =	24,000
Solid Grouting	=	Yes
Special Inspection	=	Yes
Modular Ratio 'n'	=	25.78
Short Term Factor	=	1.000
Equiv. Solid Thick.	in =	7.60
Masonry Block Type = Medium Weight		
Concrete Data		
f'c	psi =	
Fy	psi =	

Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr

Heel: #4@ 10.75 in, #5@ 16.75 in, #6@ 23.50 in, #7@ 32.25 in, #8@ 42.25 in, #9@ 4

Key: Not req'd, Mu < S * Fr

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,084	618 psf
Mu' : Upward	=	702	0 ft-#
Mu' : Downward	=	283	4,098 ft-#
Mu: Design	=	419	4,098 ft-#
Actual 1-Way Shear	=	4.35	19.54 psi
Allow 1-Way Shear	=	85.00	85.00 psi
Toe Reinforcing	=	# 4 @ 16.00 in	
Heel Reinforcing	=	# 4 @ 16.00 in	
Key Reinforcing	=	None Spec'd	

Cantilevered Retaining Wall Design

Description Masonry Wall @ 2'-0"< H < 4'-0"

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	1,045.8	2.06	2,149.6
Toe Active Pressure	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
SeismicLoad	=			
Total	=	1,045.8	**O.T.M.** =	2,149.6

Resisting/Overturning Ratio = **3.09**

Vertical Loads used for Soil Pressure = 2,827.6 lbs

Vertical component of active pressure used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	806.7	2.58	2,083.9
Sloped Soil Over Heel	=	92.4	2.89	267.0
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=	110.0	0.50	55.0
Surcharge Over Toe	=			
Stem Weight(s)	=	312.0	1.33	416.0
Earth @ Stem Transitions	=			
Footing Weight	=	656.2	1.75	1,148.4
Key Weight	=	150.0	1.50	225.0
Vert. Component	=	700.2	3.50	2,450.8
Total =		2,827.6	lbs **R.M.=**	6,646.1