

MEMORANDUM 37 :

OAKDEN DRIVE CONSTRUCTION COST

CODES: CALIFORNIA BUILDING CODE (CBC) 2007
IBC 2006
AMERICAN ASSOCIATION OF PUBLIC WORKS
CONSTRUCTION MANUAL (AAPWA); GREENBOOK

SCOPE OF WORK:

1. CIVIL ENGR DESIGN
2. PROJECT LOCATION MAP
3. ROAD DESIGN
4. COST ESTIMATE BASED ON MEMORANDUM 23 DESIGN

GEOTECHNICAL ENGINEER OF RECORD:

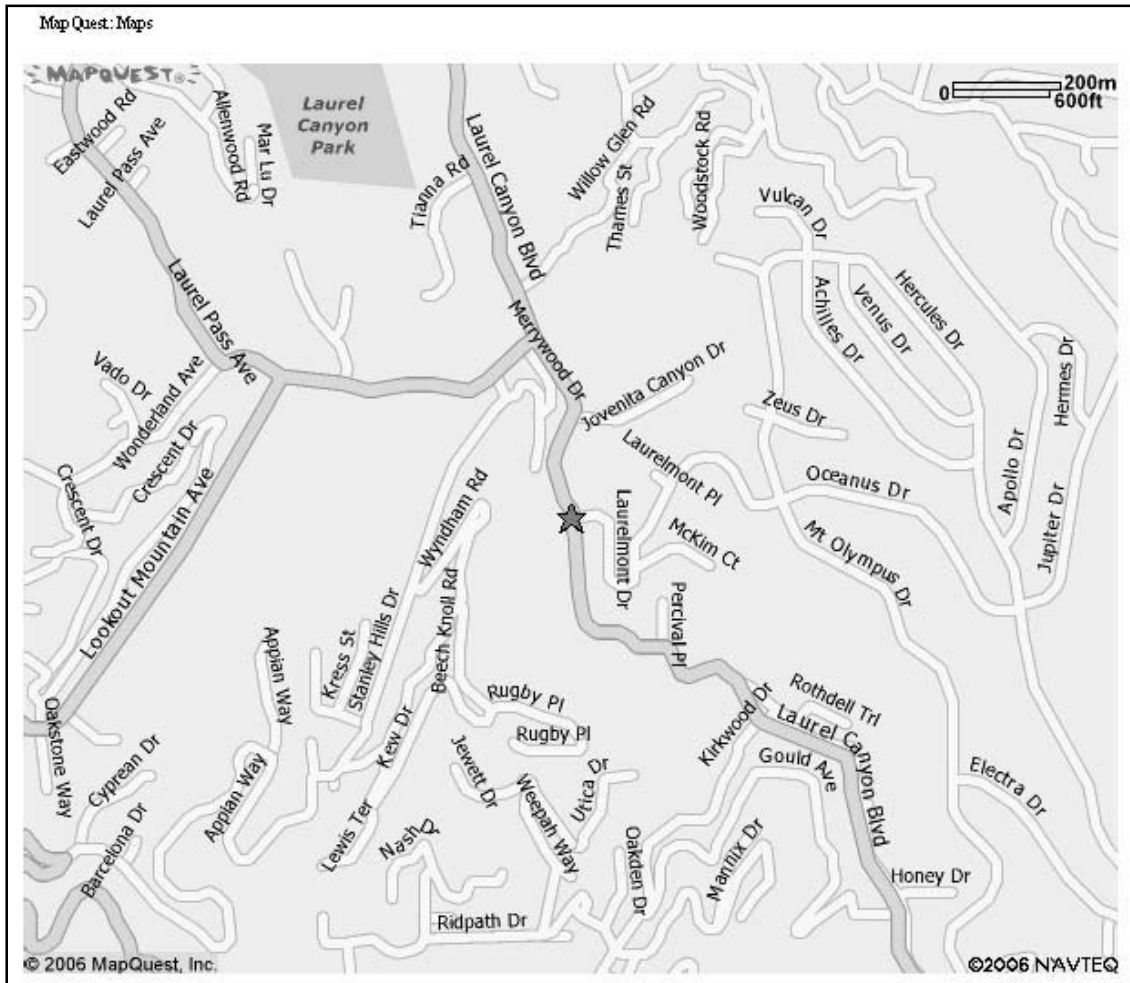
EARTH SYSTEMS SOUTHERN CALIFORNIA

1. **CIVIL ENGINEERING ANALYSIS PROCEDURE:**

THE ROAD ACCESS FROM OAKDEN IS TO BE FILED WITH A 'B' PERMIT APPLICATION. THE LENGTH IS APPROXIMATELY 325 FT, TOTAL ELEVATION RISE OF 30 FT.

DESIGN CONCEPTS ARE SHOWN TO ILLUSTRATE THE METHODS AND PROCEDURES FOR CONSTRUCTION USING SOLDIER PILES WITH TEMPORARY SHORING/LAGGING ELEMENTS.

2. PROJECT LOCATION MAP



**KHATRI INTERNATIONAL
STRUCTURAL & CIVIL ENGINEERS**

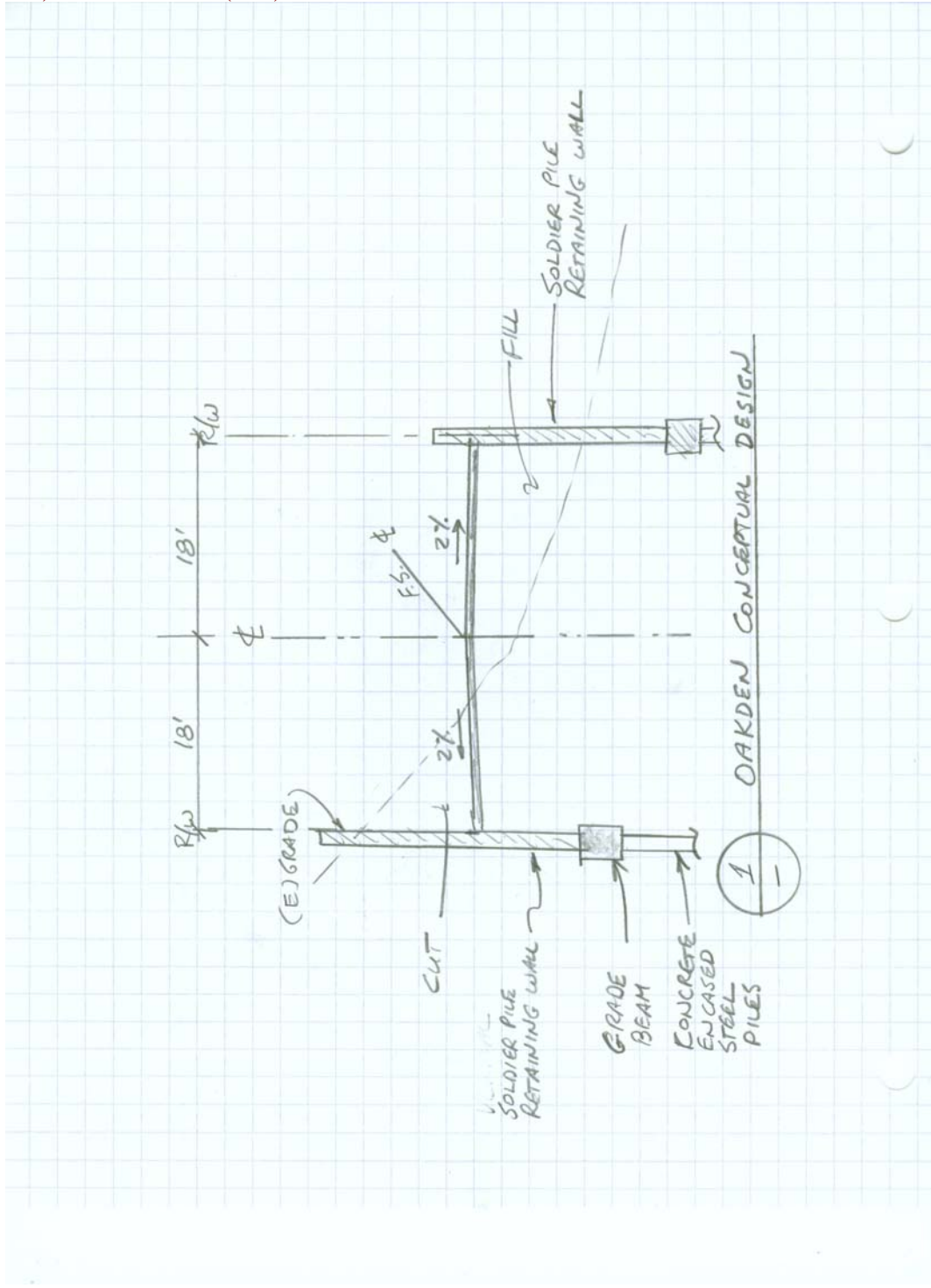
R.C.E. # 40833, SE # 4391, GENERAL CONTRACTOR # B 555505

630 N. Rosemead Blvd., Suite 200, Pasadena, CA 91107

<http://www.khatrinternational.com/>, dkhatri@aol.com

Tel. (626) 351-4830 Fax (626) 351-4339

September 14, 2007



4. COST BREAKDOWN:

I. ROAD DESIGN PARAMETERS

LENGTH = 325 FT

WIDTH = 28 FT

AREA OF ROADWAY = 325 x 28 = 9100 sq. ft.

II. SOLDIER PILES

Upslope Retaining Wall

H = 8' + 10' + 2' = 20' avg hgt

*[average height retaining wall with 10' minimum
embedment into rock; 2' for GB; 8' avg height above
grade]*

Downslope Retaining Wall

H = 8' + 10' = 18' --> use 20' avg. hgt.

Pile spacing = 10' oc [based on geotechnical
requirements]

Soldier Pile W12x120 *[based on previous design work with
28' deep piles for hillside construction]*

N = number of piles = 325/10 = 32.5 piles per wall

N = 2 x 32.5 = 65 piles

L = Total length of Piles = 65 x 20' = 1300 LF

WGT = Total Steel Wgt of Piles = 1300 x 120 = 156,000#

Material Cost = \$0.60/# x 156,000 = \$93,600

Erection and Labor = \$0.60/# x 156,000 = \$93,600

Equipment Rental = 3 months x \$6,000/month = \$18,000

Total Steel Pile Erection/Placement = \$205,000

Steel Cost/Pile = \$205,000/65 = \$3157/pile

Steel Cost/LF = \$205,000/1300 = \$158/Ft

III. CONCRETE VOLUME

24" diameter piles filled with 3,000 psi concrete

Area of Pile = $\pi r^2 = \pi \times 1^2 = 3.142$ sq. ft./pile

*Volume of Piles = 3.142 x 20' = 62.8 ft³/pile
= 62.8/27 = 2.33 cyd/pile*

Concrete cost = \$120 + \$20 + \$10 = \$150/cyd

*Total Concrete Volume = 2.33 cyd/pile x 65 piles
= 152 cyd [16 Trucks]*

Total Concrete Cost = \$150/cyd x 152

Total Concrete Cost = \$22,800

IV. MASONRY WALLS

Wall Area = 2 x 10' x 325' = 6,500 sq. ft

Units = 6,500 x 1.15 = 7,475 units

12" CMU, 3,000 psi block

Masonry Block = \$5/unit

Masonry Block cost = \$5/unit x 7,475 = \$37,375

Labor = \$10/sf x 6,500 = \$65,000

Grout = \$2/sf x 6,500 = \$13,000

Rebar = \$5/sq x 6,500 = \$32,500

Total Masonry Cost = \$147,875

V. DIRT/EXCAVATION

CUT VOLUME = AREA x Length

Cut Area = $\frac{1}{2} bh = \frac{1}{2} \times 15' \times 10' = 75 sf$
Length = 325 LF

Volume = $325 \times 75 \times 1.3 = 31,688 cf \rightarrow use 32,000 cf$
Volume = $32,000/27 = 1,185 cyd$

Trucks = $1,185/9 = 132 Trucks$

Cost/Truck = \$450/truck

Dirt Moving (export) = $132Trucks \times \$450/truck = \$59,400$

EXPORT = \$60,000

VI. ROAD PAVEMENT CROSS SECTION

AREA of Road = 9,100 sf

Base cost for Standard City of LA x-section
[based on 4" AC over 8" base]

\$6/sf

Road cost = $9,100 \times \$6/sf = \$54,600$

VII. CRANE AND ONSITE EQUIPMENT

The onsite equipment needed for this operation will be:

- (1) Gradall*
- (2) 60 Ton Crane*
- (3) Onsite Trailer*

**KHATRI INTERNATIONAL
STRUCTURAL & CIVIL ENGINEERS**

R.C.E. # 40833, SE # 4391, GENERAL CONTRACTOR # B 555505
630 N. Rosemead Blvd., Suite 200, Pasadena, CA 91107

<http://www.khatrinternational.com/> , dkhatri@aol.com

Tel. (626) 351-4830 Fax (626) 351-4339

PAGE8 OF 8

OAKDEN DRIVE CONSTRUCTION Cost Estimate

September 14, 2007

(4) Office

(5) Telephone and Temporary Power

(6) Toilet facilities

(7) Water

The timeline for this road construction is approximately 30 weeks (7 months).

Cost = \$14,000/month

Cost = \$14,000 x 7 = \$98,000

VIII. GENERAL CONDITIONS

Standard GC for this project are charged at 4% of the base cost. This includes cost for insurance, worker compensation, builder risk coverage, and construction bonds.

IX. OVERHEAD & PROFIT

Khatri International's O&P margin is 14% of the base bid.

X. TOTAL ESTIMATE

BASE BID (hard cost)	=	\$	588,275
General Conditions	=	\$	23,531
Khatri O&P	=	\$	82,359
<u>TOTAL ROAD CONSTRUCTION</u>	=	\$	<u>694,165</u>