KELLOGG

REVIEW OF PRE-PRELIMINARY CAPITAL COST ESTIMATE

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

METRO RAIL PROJECT LOS ANGELES, CALIFORNIA

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

March 31, 1983

KC1223

JEK, AWJ, DDL, HEB,
REC, GHM, VET

GEH

METRO RAIL PROJECT
LOS ANGELES, CALIFORNIA

OWNER:	Southern California Rapid Transit District
GENERAL ENGINEERING CONSULTANT: WAYS AND STRUCTURES	DMJM/PBQD A Joint Venture
GENERAL ARCHITECTURAL CONSULTANTS: STATIONS	Harry Weese & Associates Tippetts-Abbett-McCarthy-Stratton Environmental Collaborative, Inc. Gin Wong Associates
GENERAL GEOTECHNICAL CONSULTANTS:	Converse Ward Davis Dixon Earth Sciences Associates Geo/Resource Consultants
SUBSYSTEMS CONSULTANT:	Kaiser Engineering

REVIEW OF PRE-PRELIMINARY CAPITAL COST ESTIMATE

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CONTENTS

CONTENTS (Continued)

CONTENTS (Continued)

SECTION 1

INTRODUCTION

Kellogg Corporation was retained by the Southern California Rapid Transit District (SCRTD) to review the $2.3 billion pre-preliminary capital cost estimate for their Metro Rail Project. Metro Rail is the starter line of a 140-mile to 160-mile heavy/light rail rapid transit system which will serve the greater Los Angeles area. The initial project includes 18 miles of subway, 16 stations, and a storage and maintenance yard which will link the densely populated/employed areas of central Los Angeles and North Hollywood. SCRTD is currently in the preliminary engineerng phase, with final design and construction to take place between 1984 and 1990.

The pre-preliminary cost estimate was prepared under the direction of DMJM/PBQD, A Joint Venture, which was responsible for the guideway, yard and trackwork estimates. Harry Weese & Associates (HWA), the general architectural consultant, was responsible for the stations, parking and control facility. Kaiser Engineers (KE) provided cost estimates for the specialty systems such as train control, traction power and vehicles. The City of Los Angeles estimated the cost of utility relocation.

The summaries of Kellogg Corporation's findings are presented in Section 2 of this report. Details of the analysis are discussed in Sections 5-A through 5-Y, with supporting documentation and computations contained in the corresponding alphabetical appendix. Section 3 presents Kellogg's scope of work, which is important since Kellogg was not required to review all elements of the estimate. Section 4 defines the documents which formed the basis of the estimate.

Kellogg's analysis indicates an estimated capital cost, for the scope of work defined, of $3.0 billion. The pre-preliminary estimate is thus low by $756 million or 25 percent. Both estimates are expressed in 1982 dollars with no allowance for escalation. Kellogg checked DMJM/PBQD's direct costs within 2-1/2 percent. The primary variances are in the indirect costs and the method of their application.

The cost of construction of the Metro Rail Project will be greatly influenced by a number of intangible factors which include:

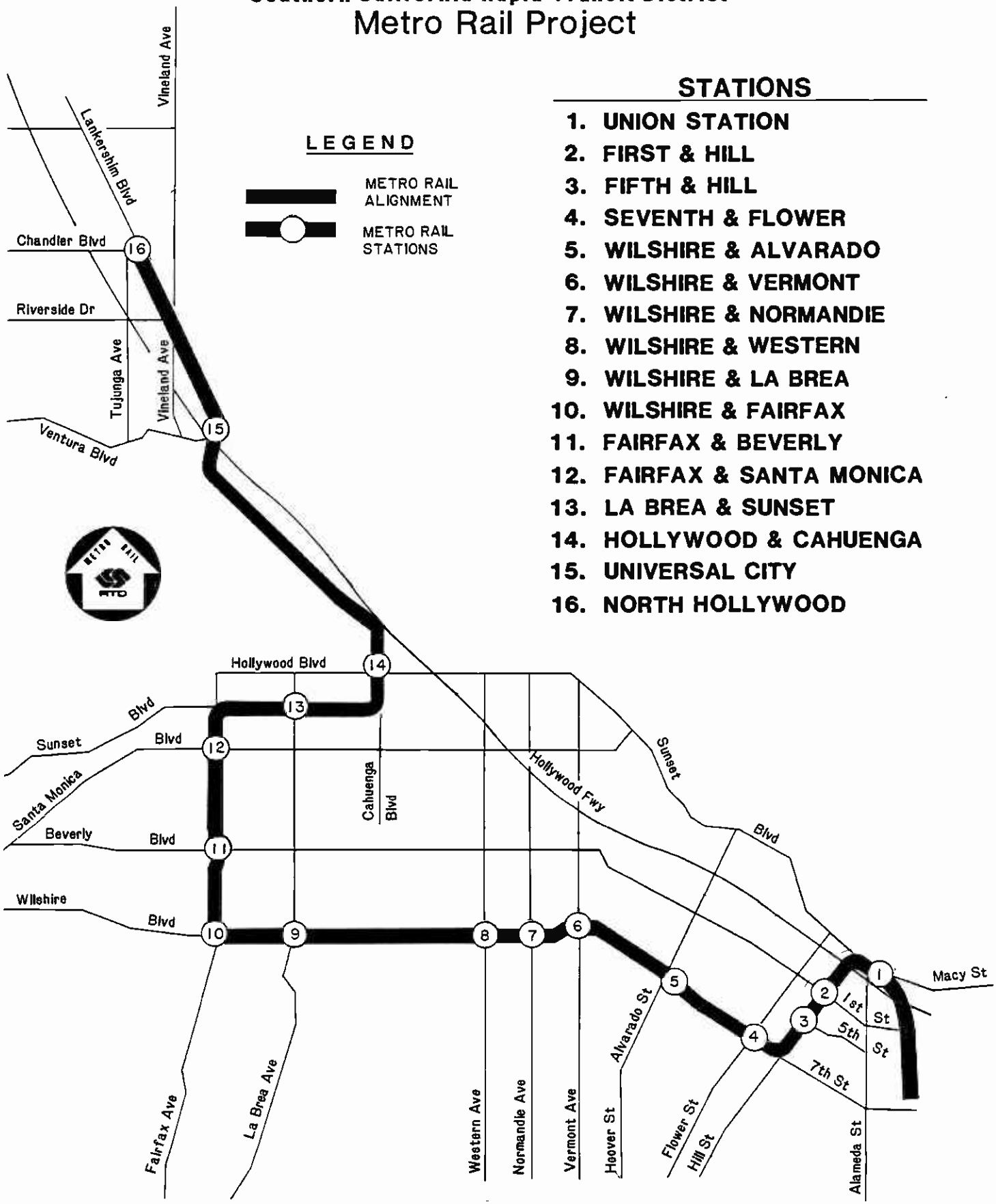
- The commitment and cooperative spirit of all parties involved, including political interests, government interests, utility companies, private business, railroads, contractors, and the labor community.
- Construction management structured for problem-solving, in an effective and timely manner.
- Construction contract language equitable to both parties and clearly defining allocation of risk.
- Performance of comprehensive subsurface investigations and distribution of findings to all parties.

Kellogg Corporation's check of the pre-preliminary estimate assumed the above considerations would be addressed and implemented into the construction program.

ROUTE ALIGNMENT

Southern California Rapid Transit District

Metro Rail Project



STATIONS

1. UNION STATION
2. FIRST & HILL
3. FIFTH & HILL
4. SEVENTH & FLOWER
5. WILSHIRE & ALVARADO
6. WILSHIRE & VERMONT
7. WILSHIRE & NORMANDIE
8. WILSHIRE & WESTERN
9. WILSHIRE & LA BREA
10. WILSHIRE & FAIRFAX
11. FAIRFAX & BEVERLY
12. FAIRFAX & SANTA MONICA
13. LA BREA & SUNSET
14. HOLLYWOOD & CAHUENGA
15. UNIVERSAL CITY
16. NORTH HOLLYWOOD

SECTION 2 - SUMMARY OF ESTIMATE REVIEW

SECTION 2

SUMMARY OF ESTIMATE REVIEW

In Kellogg Corporation's opinion, the pre-preliminary capital cost estimate, revised January 7, 1983 is low by approximately $756 million or 25 percent. Our analysis indicates an estimated capital cost, for the scope of work defined, of $3.027 billion. This total estimate cost is expressed in 1982 dollars, with no allowance for escalation. This total also assumes that cost items not within Kellogg's scope of review are correct. These items, which are defined in Section 3 of this report, were not adjusted, and were carried in the estimate at their current defined values.

Kellogg Corporation computed variances from the pre-preliminary estimate on a direct cost basis. The DMJM/PBQD total estimate was reduced back to a direct cost level to which this net variance was applied. To this adjusted direct cost sum, was added recommended allowances for contractor mark-ups, engineering design and construction management, SCRTD agency costs, wrap-up insurance, contingencies and right-of-way.

The dollar summaries of Kellogg Corporation's findings are contained in the tables on the following three pages. At the direct cost level, the plus and minus variances largely offset each other resulting in Kellogg recommending a direct cost deduct of $32.7 million or only 2 1/2 percent of DMJM/PBQD's direct costs.

The major areas of recommended increases are in the costs which are added onto the direct costs. This includes contractor mark-ups for which Kellogg recommends a rate of 43.45 percent versus DMJM/PBQD's rate of 15 1/2 percent. This factor alone results in an increase of $338 million. Kellogg has also included an 11 percent allowance for change orders, differing site conditions, etc., which occur after contract bid and award. (Not to be confused with contractor's contingencies which are included in their bid mark-ups). The pre-preliminary estimate did not include an allowance for this item, hence the Kellogg recommended addition at 11 percent results in an addition of $232 million.

Kellogg Corporation is in agreement with, and has included the same percentage allowances as DMJM/PBQD for design contingencies (20 percent), engineering design and construction management (13 percent), agency costs (5 percent), and wrap-up insurance (4.2 percent). The method of application, however, and resulting compounding of dollars is quite different. Kellogg believes that the engineering design and construction management, agency, and insurance percentages should be applied to a capital cost subtotal which <u>includes</u> the 20 percent design contingency. Kellogg's estimate would be $117 million lower without this compounding. The method of application of these indirect cost items is subject to SCRTD's management philosophy.

REVISED CAPITAL COST ESTIMATE

Contractor's Costs in Pre-preliminary Estimate Including Markup @ 15.5%	$1,455,100,000
Deduct Contractor's Markup	-195,300,000
Direct Costs in Pre-preliminary Estimate	$1,259,800,000
Deduct Total Direct Cost Variance According to Kellogg Corporation's Estimate (See next page for calculation)	-32,687,000
Adjusted Direct Costs	$1,227,113,000
Contractor's Markup @ 43.45%	533,181,000
Contractor's Costs in Kellogg Corporation's Estimate	$1,760,294,000
Design Contingencies @ 20%	352,059,000
Capital Cost Subtotal	$2,112,353,000
Engineering Design and Construction Management @ 13%	274,606,000
Agency Costs @ 5%	105,618,000
Wrap-up Insurance @ 4.2%	88,719,000
Allowance for Change Orders, Differing Site Conditions, Etc. @ 11%	232,359,000
Right-of-Way Acquisition	213,500,000
Total Revised Capital Cost Estimate	$3,027,155,000

SUMMARY
DIRECT COST VARIANCE

Reference Section	Description	Recommended Adjustment to Pre-preliminary Estimate
5B	Tunnels	-$30,119,000
5C	Station Shell	-13,049,000
5D	Station Architectural	+1,350,000
5E	Stations—Mechanical and Electrical	-16,235,000
5F	Crossovers, Pocket Tracks and Tail Track	+21,400,000
5G	Line Vent Structures—City and Mountain	-870,000
5H	Vent Structures—Mechanical and Electrical	-2,700,000
5I	Utilities	+11,815,000
5J	Underpinning	-1,157,000
5K	Traffic Maintenance	+12,173,000
5L	Dewatering	+3,228,000
5M	Trackwork	-14,351,000
5N	Traction Power	(No Change)
5O	Main Yard	-4,300,000
5P	Buildings—Structural and Architectural	(No Change)
5Q	Buildings—Mechanical and Electrical	+128,000
5R	Parking	(No Change)
	Recommended Direct Cost Adjustment to Pre-preliminary Estimate	-$32,687,000

SUMMARY OF INDIRECT COST VARIANCES

Description	Pre-preliminary Estimate	Kellogg Corporation Estimate		Recommended Change
Contractor's Markup	$195,300,000	$533,181,000	Add	$337,881,000
Design Contingencies	$291,000,000	$352,059,000	Add	$ 61,059,000
Engineering, Design, and Construction Management	$189,200,000	$274,606,000	Add	$ 85,406,000
Agency Costs	$ 72,800,000	$105,618,000	Add	$ 32,818,000
Wrap-up Insurance	$ 50,000,000	$ 88,719,000	Add	$ 38,719,000
Allowance for Changes, Differing Site Conditions, Etc.	$ 0	$232,359,000	Add	$232,359,000
Total Recommended Changes for Indirect Costs			Add	$788,242,000

SECTION 3 - KELLOGG CORPORATION METHODOLOGY AND SCOPE OF WORK

SECTION 3

KELLOGG CORPORATION METHODOLOGY AND SCOPE OF WORK

Kellogg Corporation accomplished this scope of work in accordance with our proposal to SCRTD dated February 7, 1983. Work was commenced on March 1, 1983 and completed April 1, 1983. Work activities included the following:

- Meet with key personnel of SCRTD and their consultants to review the evolution and status of the construction cost estimates.
- Identify and review the pertinent documents which form the basis of the cost estimates.
- Perform a preliminary review of the cost estimate to determine the methodology and underlying assumptions upon which it is based.
- Identify high risk elements which could impact costs.
- Become familiar with the proposed alignment by actual site visit.
- Perform a detailed review of the cost estimates to identify specific areas for further study and analysis.
- Analyze items identified for detailed study.
- Draft final report.

During the site visits of the route alignment, station locations and main yard, more than 150 photographs were taken which were utilized by other Kellogg team members who were unable to visit the site. The geologic information was also transferred to the 20 sheet profile to allow a more detailed analysis of subsurface conditions expected to be encountered during construction.

The table below presents a summary of the DMJM/PBQD estimate, the consultant responsible for each section, and whether Kellogg did or did not review that part of the estimate. For those items not in Kellogg's scope of work, the DMJM/PBQD values were used as is to develop a total revised cost for the project. Also noted is the percentage that each item is of the capital cost subtotal. Inasmuch as stations and guideways compose 65 percent of this subtotal, Kellogg spent the major part of their effort analyzing the costs of these features. The Kellogg analysis

and organization of this report is based upon type of construction activity as well as the type of facility being constructed. This was done to allow analysis of that element of the construction process for the entire project by an individual having particular expertise in that area.

PRE-PRELIMINARY ESTIMATE REVISED JANUARY 7, 1983

Item	Responsible Consultant	Cost (1982)	Percent of Capital Cost Subtotal	In KC Scope of Work
Guideways	DMJM/PBQD	$503,800,000	35%	Yes
Stations	HWA	430,900,000	30%	Yes
Utilities	City of Los Angeles	25,000,000	2%	Yes
Parking	HWA	44,200,000	3%	Yes
Central Control Facility	HWA	1,500,000	Nil	Yes
Main Yard	DMJM/PBQD	46,200,000	3%	Yes
North Hollywood Tail Track	DMJM/PBQD	23,500,000	2%	Yes
Trackwork	DMJM/PBQD	62,300,000	4%	Yes
Train Control	KE	64,600,000	4%	No
Communications	KE	22,400,000	1%	No
Traction Power	KE	42,600,000	3%	Yes
Fare Collection	KE	18,800,000	1%	No
Vehicles- Passenger (140)	KE	168,000,000	12%	No
Vehicle- Auxiliary	KE	1,300,000	Nil	No
Capital Cost Subtotal		$1,455,100,000	100%	
Design Contingency (20%)		291,000,000		Yes
Right-of-Way	SCRTD Spec. Consult.	213,500,000		No
Engineering Design & Constr. Mgmt. (13%)		189,200,000		Yes
Agency Cost (5%)		72,800,000		Yes
Insurance		50,000,000		Yes
Total Cost (1982 Dollars without Escalation)		$2,271,600,000		

[redacted]

SECTION 4 - BASIS OF ESTIMATE

SECTION 4

BASIS OF ESTIMATE

Kellogg Corporation's estimate work was based upon the following documentation, which defined the scope of the project, the time frames, sequences and packaging of construction, and the current expression of the estimate.

- "SCRTD Metro Rail Project EIS Capital Cost Estimate," revised January 7, 1983, prepared by DMJM/PBQD.
- "Estimating Methodology and Procedures," dated February, 1983, prepared by DMJM/PBQD.
- DMJM/PBQD drawing No. AP-14AAA-C-103, "Metro Rail Starter Line Schematic Diagram," dated December 28, 1982 (also stamped "January 1, 1983 conceptual budget").
- DMJM plan and profile drawings (sheets 1 to 20) entitled "Milestone 3 Route Alignment Alternatives, Recommended Alignment," dated January 16, 1983 and January 17, 1983. (Drawing No's. AP-14AAA-C-046 to 055, 067 to 072, 081, 087, 088 and 101.)
- Harry Weese & Associates 8-1/2 x 11 footprint and section drawings of the 16 proposed stations.
- Harry Weese & Associates architectural, mechanical and electrical drawings as noted below:

Drawing	Title	Date
GPM-1	HVAC-Plumbing and Fire Protection	10/12/82
GPM-2	HVAC-Flow Diagram	10/12/82
GPM-3	Plumbing	10/12/82
GPM-4	Fire Protection	10/12/82
GPM-5	HVAC-Controls	10/12/82
GPM-6	Schedules/Standard Details	10/12/82
GPE-1	Station Electrical Service	—
GPE-1a	Station Electrical Service - Fifth & Hill	—
SK-11	Station Sections and Plans	8/24/82
GPA-15	Western Station - Site Plan	10/1/82
GPA-16	Western Station - Plans and Sections	10/1/82
SK-26	Fifth & Hill Station (Over-Under Section	9/22/82

- DMJM/PBQD "Project Schedule - Facilities and Systemwide Construction-Normal," Sheets 1 to 5, Revision 2, dated January 12, 1983.
- "Geotechnical Investigation Report" By CEG, The General Geotechnical Consultant, dated November, 1981.
- Technical report, "Traffic Control Policies During Construction" by the Department of Transportation, City of Los Angeles, dated February, 1983.
- Draft report of the "Muck Disposal Study" by Sedway/Cook, cover letter dated November 23, 1982.
- A sample draft of a master cooperative agreement between SCRTD and the state of California.
- Detailed traction power estimate prepared by Kaiser Engineers.

The following additional documents were utilized for general concept and informational purposes since they relate to a later and revised design scope from that under Kellogg's review:

- SCRTD preliminary draft of the Metro Rail Project Milestone 10 report, dated February, 1983.
- SCRTD "Contract Unit Descriptions" for the Metro Rail Project, dated March, 1983.

The UMTA computerized station cost print-out was not utilized by Kellogg in our analysis.

SECTION 5 - ESTIMATE REVIEW (A THROUGH Y)

SECTION 5-A

ESTIMATE ORGANIZATION

Description

Kellogg Corporation reviewed the pre-preliminary estimate for organization and coordination to ensure the estimate adequately covered the intended scope of the project, without major omissions or duplications. A part of this review was procedural, to check for extension, adding or transposition errors.

Basis of Analysis

The following documents were utilized in reviewing the estimate organization:

- The DMJM/PBQD estimate.
- The DMJM/PBQD methodology.
- The DMJM/PBQD metro rail schematic diagram.
- The DMJM/PBQD 20-sheet plan and profile drawings.

The following individuals were interviewed regarding estimate organization:

- James E. Crawley - SCRTD
- Howard J. Chaliff - DMJM/PBQD
- Donald King - SCRTD
- Charles J. Proctor - SCRTD
- John Bond - DMJM/PBQD
- Al Levy - SCRTD
- Robert Cutlip - TAMS
- Vern Montgomery - City of Los Angeles
- John E. Moss - DMJM/PBQD - Consultant
- David H. Holdaway - DMJM

General Discussion

Kellogg utilized several methods to look at the "big picture," attempting to check for and pick up any large discrepancies and errors. The objective of this analysis was to seek answers to the following questions:

- Are all of the elements included?
- Are there major quantity or unit price errors? Is a big piece left out?
- Are there errors in the extension, addition, or transposition of numbers?
- Are there major duplications of costs?
- Are there major judgement errors in the scope of work?

In addressing these issues, Kellogg first reviewed the estimate methodology in detail to determine how the estimate was planned to be organized and executed. The estimate was then reviewed in detail for consistency and compliance with the methodology. An outline of this review is included in the Appendix. During this review, the forwarding of numbers to the summary sheets and then to the summary spread sheet was checked. The major additions on this sheet were checked as well as the forwarding to the DMJM/PBQD summary letter of transmittal of January 6, 1983.

Kellogg also made more detailed checks of the system activities as a whole and in particular the estimates of the station shell and tunnel construction. The spread sheets listed below were made to check for major errors as well as for consistency between similar estimates. These spread sheets are contained in Appendix A.

- System feature take-off (similar to DMJM/PBQD's length analysis).
- Tunnel estimate check - dollar amounts.
- Tunnel estimate check - primary features.
- Station shell comparative check of dollar subtotals.
- Station shell estimate check - quantities.
- Station shell estimate check - unit prices.

Findings and Conclusions

In general, the various parts of the estimate are well organized and it tracks well. There are, however, a fair number of mathematical errors and duplications of costs. Kellogg did not check all extensions and additions but some major errors did come to light as a result of the previously described analysis. It is strongly recommended that all of the estimate sheets on this and future estimates be checked for mathematical accuracy and coordination.

Major errors and discrepancies discovered in the estimate include the following:

- Several addition errors were discovered in the station shell estimate in the range of one to two million dollars. These tended to cancel each other and resulted in a net overstatement of $1 million.
- There are major errors in extension. Errors such as in the control building estimate ($2.9 million), and the downtown vent shaft soldier pile and lagging ($0.4 million).
- Duplication of costs for two parking structures in the station shell estimates and the G-1 to G-17 summary sheets resulted in an overstatement of $15 million in costs.
- Duplication of underpinning costs resulted in an overstatement of $4 million.
- Failure to add a shield pit in the tunnel estimate resulted in a $0.4 million understatement.
- Failure to extend computations for the vent shaft earthwork, resulted in an understatement of $1.2 million.
- Duplication of street restoration work in the station shell estimates and the utility relocation estimate resulted in an overstatement of nearly $5 million.
- Duplication of costs for the mechanical work in the vent shafts resulted in a $2.7 million overstatement.
- Builders risk insurance is listed in the indirect expense checklist and also added as a separate owner-incurred cost (a duplication).
- Labor rates utilized in the development of direct costs are in the range of $22 to $30 per hour which implies a full burden of fringes, insurance and taxes. These costs, however, are also listed to be a part of contractor indirect cost markup (a duplication).

- Mobilization is added in many cases as 4 percent of direct costs prior to markup for contractor's field overhead. Kellogg considers mobilization to be a part of field overhead.

- Contractor's bond cost should be applied after profit has been added, not before. Bond premiums are based on contractor's total job revenue.

- The DMJM/PBQD stated methodology for profit computation is in line with Kellogg philosophy, however, it was not followed which resulted in a gross understatement.

- Mark-up is added to estimates based upon total cost unit prices, resulting in a duplication.

- There is no allowance in the estimate for contractor's home office general and administrative expense.

- Corrosion protection does not appear to be addressed in the estimate; however, it may not be required in the Los Angeles area.

- There is no allowance in the estimate for costs related to changes or differing site conditions occurring after contract award.

- Dewatering cost allowances are extremely low.

- Traffic control and maintenance costs are extremely low.

- The schematic diagram shows the El Monte extension ending at Station 94+20. This indicates that none of the "Y" section under the Los Angeles River is to be constructed. This is inconsistent with the plan and profile drawings. There is no money in the estimate to construct the "Y" portion of the alignment except that connecting to the yard. There is, however, $20 million to underpin the Santa Ana Freeway. Kellogg believed this was to underpin the freeway at the intersection with the Los Angeles River. The estimate also includes at-grade track in Reach No. 1 which is not consistent with the schematic or profile.

These items are all addressed in the detailed analysis sections of this report (Sections 5B - 5Y). The recommended additions or deletions to the estimate are included in the appropriate section. Fortunately, many of these errors were offsetting, minimizing the impact on the direct cost value of the estimate. Kellogg recommends the appointment of an estimate coordinator whose role will be to mitigate these types of problems on the final preliminary estimate.

SECTION 5-B

TUNNELS

Description

This item includes the direct costs to excavate, line and grout approximately 80,000 linear feet of twin bore tunnel. Also included in this item are direct costs for muck disposal, cross passages, steel tunnel liner and tunnel finishing.

This item does not include station work or contractor's mark-ups. These items are addressed separately in other sections of this report.

Basis of Analysis

The following documents have been reviewed concerning tunnel work:

- The DMJM/PBQD pre-preliminary cost estimate.
- Milestone 10 Definitive Fixed Facilities and Plans, Alignment Plan and Profile, Sheets 1 through 21 inclusive.
- Geotechnical Investigation report.
- Document WBS 14AAE "Estimating Methodology and Procedures."
- Phase A1, A2, A3 and A4 project schedule, updated January 6, 1983, stamped "Preliminary for Design Study Only."
- Drawing No. AP-14AAA-C-103 entitled "Metro Rail Starter Line Schematic Diagram."

The following individuals have been interviewed by Kellogg Corporation concerning tunneling:

- James E. Crawley - SCRTD
- Howard J. Chaliff - DMJM/PBQD
- John E. Moss - DMJM/PBQD - Consultant
- Charles J. Proctor - SCRTD

Kellogg cost estimates of direct tunnel costs are based on historical data for similar projects adjusted for productivity and escalation and experience in underground construction estimating.

General Discussion

TBM advance rates of 26 linear feet per day for A1, A3 and SP and 43 linear feet per day for A2, A4, C and 1-5 have been established for the Kellogg estimate. These advance rates are consistent with the rates presented in the pre-preliminary estimate, but are judged to be conservative. Kellogg estimate TBM advance rates are predicated on the assumption that precast tunnel liner segments must be installed before advancing the TBM. TBM advance rates of 45 linear feet per day and 90 linear feet per day may be realized if ground and construction conditions preclude the need for this constraint.

With the exception of steel lining for Reaches 5 and 8, no allowance has been taken in the Kellogg cost estimate for gassy or potentially gassy conditions in Reaches 2, 5, 6 and 8. If OSHA adopts regulations similar to those used by MSHA for gassy environment or should SCRTD adopt specifications consistent with such regulations, tunneling costs will be impacted by:

- The required use of certified gassy application electric and diesel equipment.
- Increased ventilation requirements.
- Increased standby and delay time.
- Probe holes in the tunnel face, two to three times the length of daily advance rate.

The Kellogg and the pre-preliminary cost estimates include costs for steel lining in Reaches 5 and 8, as well as precast liner segments in the same areas. It is customary to install steel lining, or steel lining and cast-in-place concrete in lieu of precast segments. Therefore, subject to design considerations, the installation of steel liner and precast segments in the same locations may be perceived as a "double dip."

Kellogg Corporation recommends tunneling through the stations at First and Hill, Fifth and Hill, and Fairfax and Wilshire. Advancing and restarting TBM's in a two-tier tunnel station arrangement will otherwise require a unique, risky and costly construction approach. (The two-tier configuration has since been eliminated from consideration.)

In view of the significant capital investment for TBM's in this estimate, SCRTD may wish to consider a sequential tunnel construction approach in lieu of parallel construction to maximize the reuse of the TBMs.

Findings and Conclusions

- Kellogg Corporation is, in general, in agreement with the pre-preliminary estimate construction quantity take-offs. Although a comparison of the pre-preliminary estimate and the Kellogg Corporation estimate will demonstrate significant variations in direct unit and total cost by generic cost classification, the total cost for all tunnel work varies by less than ten percent. The pre-preliminary tunnel cost estimate appears to be a sound estimate, pending final design definition.

- The pre-preliminary tunnel estimate includes a category for general expenses which has been deleted from the Kellogg Corporation direct tunnel cost estimate since these costs are considered by Kellogg Corporation and SCRTD (reference document WBS 14AAE "Estimating Methodology and Procedures") to be overhead costs. General expenses are included in the Kellogg Corporation estimate as overhead costs.

- The pre-preliminary and Kellogg Corporation estimates of tunnel excavation, lining and grout duration differ significantly for Reaches 8 and 14; however, cumulative estimates of duration for all reaches for tunnel excavation, lining and grout agree within 4 percent.

- Kellogg's pre-preliminary estimate of craft manpower per heading per shift is 83 percent of the pre-preliminary estimate (25 versus 30) and Kellogg's estimate of craft labor rate with fringes and burden is 90 percent of that used in the pre-preliminary estimate ($27 per manhour versus $30 per manhour). The Kellogg estimate of tunnel labor cost is 78 percent of that derived in the pre-preliminary estimate.

- Costs for equipment maintenance material, tunnel temporary utility lines and track, and small tools and supplies appear to have been overlooked in the pre-preliminary estimate. Kellogg's estimate for these consumables is $24,160,000.

- Costs for electricity, fuel and lubricants show a significant variation in magnitude. Kellogg's estimate is 520 percent of the value used in the pre-preliminary estimate.

- The pre-preliminary and Kellogg Corporation estimates of unit cost and total cost for cross passages and finish tunnel show wide variations, probably due in part, but not totally, to planned construction approach. The Kellogg estimate of cross passages is 54 percent of the value derived in the pre-preliminary estimate and Kellogg's estimate of finish tunnel is 227 percent of the pre-preliminary estimate.

- There is no significant variance in total cost for the cost categories of muck disposal and steel liner.

- Ground water and shield pit cost categories show no variance.

- Kellogg's estimate of tunnel permanent material is 92 percent of the value shown in the pre-preliminary estimate.

- The Kellogg estimate of tunnel equipment is 83 percent of that shown in the pre-preliminary estimate.

- The Kellogg estimate of total cost per linear foot of tunnel is within .06 percent of the pre-preliminary total cost per linear foot of tunnel excluding general expenses.

The pre-preliminary cost estimate may be adjusted as noted below to attain the Kellogg Corporation cost estimate of direct cost. Supporting computations are included in Appendix B.

Pre-preliminary current cost estimate	$384,200,000
Round off variance (deduct)	-1,291,667
Overhead and profit (deduct)	-49,944,566
Pre-preliminary estimate - direct cost	$332,963,767
*Shield pit (add)	+391,000
Corrected pre-preliminary estimate - direct cost	$333,354,767
Labor variance (deduct)	-23,652,000
Material variance (deduct)	-7,139,000
Equipment variance (deduct)	-8,813,000
Consumables variance (add)	+32,625,000
Muck disposal variance (deduct)	-3,287
Cross passages variance (deduct)	-6,887,000
Steel liner variance (deduct)	-370,980

*Deleted from pre-preliminary cost estimate rollup.

Finish tunnel variance (add)	+10,276,000
General expenses (deduct)	-25,254,500
Kellogg Corporation estimate - direct cost	$304,136,000
Net change:	
Direct cost variance (deduct)	$-29,218,767
Shield pit (add)	+391,000
Round off variance (deduct)	-1,291,667
Net change (deduct)	-30,119,434
	Call $-30,119,000

SECTION 5-C

STATION SHELL

Description

This item includes an analysis and estimate review of the heavy construction of the structural shell of the proposed 16 stations of the metro rail starter line.

This item does not include the normal completion contract work, or architectural features such as tile, painting, signing or electrical/mechanical. Also excluded are specialty items such as underpinning, traffic control, dewatering or utility supports which are covered in other sections of this report.

Basis of Analysis

The following documents were reviewed in the preparation of this section:

- The DMJM/PBQD pre-preliminary capital cost estimates.
- The metro rail starter line schematic diagram dated December 28, 1982.
- The geotechnical reports and drawings.
- Preliminary station drawings and sketches.

The following individuals were interviewed:

- James E. Crawley - SCRTD
- Howard J. Chaliff - DMJM/PBQD
- Donald King - SCRTD
- John E. Moss - DMJM/PBQD - Consultant
- Charles J. Proctor - SCRTD
- Al Levy - SCRTD
- Neil Richards - SCRTD

A complete site examination of all station locations was made in early March 1983.

References used for cost information and in estimating the station shell features (adjusted for productivity and escalation) were those retained during previous employment on the following rapid transit projects:

- San Francisco (BART)
- Washington (WMATA)
- Atlanta (MARTA)

General Discussion

The limitation of time and the absence of final design and related details prevented a definitive type estimate, however, the estimate check was accomplished as follows:

- A typical station, of average overall dimensions, was selected for the determination of unit costs. The Western Avenue Station was used and the developed unit costs adjusted for the other stations according to dimension or estimated difficulty variance.
- The high cost, high contingency or risk features such as excavation, soldier pile and lagging, muck disposal and decking quantities were checked by take off. These items were then "crewed up" in detailed estimating fashion and direct unit costs established.
- Concrete form quantity allowances, as estimated by DMJM/PBQD, were examined for reasonableness by comparing the various concrete placement type of work against the form ratio, i.e., square feet of form per cubic yard of concrete.
- Concrete placing costs for the various types of construction were "crewed up" and the unit price allowances checked by detailed estimating.
- Demolition allowances were estimated in detail for the Western Avenue Station. A special check of Union Station demolition was performed because of the unusual conditions and features relating only to this station.
- The general allowance of 200 pounds of reinforcing steel allowed per cubic yard of concrete was examined by prorating the total to the various concrete placement types. The required rebar ratio to concrete quantity for each feature was established and a total rebar quantity thereby determined.

- The secondary operations relating to concrete, such as curing and finishing, were rough checked as the completeness of design permitted for quantum. The unit costs were then compared with existing cost records and cross checked by the several available construction cost data publications.

- The site restoration items were estimated in detail and cross checked in cost data references.

- The quantity take off calculation sheets and detailed estimating back up studies are included in Appendix C of this report.

Findings and Conclusions

In general, we agree with the direct construction cost quantities and unit prices as estimated by DMJM/PBQD. The actual details of our estimate review are as follows:

- The machine excavation unit price is approximately 50 percent of what Kellogg Corporation estimates this cost to be.

- The excess soil disposal estimate is approximately 15 percent low. This does not reflect the possibility that a market exists for some of this material thereby offsetting this potential cost problem.

- The soldier pile and lagging estimate is 15 percent above Kellogg Corporation's estimated unit price.

- The decking allowance by DMJM/PBQD is approximately 15 percent below Kellogg Corporation's estimate.

- The formwork estimate requires no change.

- Concrete placing costs (estimated to be $5.00 per cubic yard) are low for all concrete other than mass (grade slabs).

- The pre-preliminary estimate includes no allowance for concrete placed outside of excavation neat lines. An allowance of approximately 3 percent is recommended and has been included in Kellogg Corporation's analysis.

- There was no unit price analysis of compacted backfill as related to the degree of engineered fill requirements. The extent of hand work around utilities is also unknown. The unit price used in the estimate would allow for a very high percent of imported hand compaction. This unit price is probably high.

- Site restoration items were checked resulting in no recommendation for change.

- A straight line reduction of $460,000 per foot for vertical reduction in station depth should be re-examined with more complete design. We have reviewed the calculations resulting in this savings and find no fault in the general theory. Unit pricing however, does change variably with depth which is not included in the computations. In addition, the analysis relates to major changes in depth, of 20 to 40 feet, but then the variance is applied to minor changes of only 2 to 8 feet. Kellogg Corporation estimates a generous depth reduction cost for minor variations to be roughly $236,000 per vertical foot (direct cost). This results in a direct cost increase in the current estimate of $5,084,000.

- The station estimates for the Beverly/Fairfax Station and the Universal City Station contain parking structures totaling $15,150,000. This is a duplication, as these facilities are also priced on the "reach" summary sheets.

A tabulation of the cost variance is presented in the following two pages.

Summary of Station Shell Variances

No.	Station	Total Increase in Direct Costs
1	Union	$ 167,000
2	1st Hill	630,000
3	5th Hill	1,100,000
4	7th Flower	175,000
5	Alvarado	114,000
6	Vermont	90,000
7	Normandie	120,000
8	Western	140,000
9	La Brea	160,000
10	Fairfax	900,000
11	Beverly	65,000
12	Santa Monica	150,000
13	Sunset	160,000

14	Hollywood	170,000
15	Universal	225,000
16	North Hollywood	175,000
	Subtotal	$4,541,000
Deduct parking structure duplication (included elsewhere)		-$15,150,000
Deduct mobilization allowance duplication (included elsewhere)		-$ 7,524,000
Add for overstatement of depth reduction		+$ 5,084,000
Net Variance		-$13,049,000

SECTION 5-D

STATION ARCHITECTURAL

Description

This item includes the architectural finishes costs of the 16 passenger stations. Thirteen of these stations are single level stations and the remaining three are over-under type or bi-level stations. These cost figures assumed that the station shell work was properly finished and cleaned so as to allow the finish contractor to commence his work. No money was included for contingencies, construction management and the general contractors field overhead, general and administrative expenses and profit, all of which will be addressed elsewhere in the report.

Basis of Analysis

The following documents have been reviewed:

- Harry Weese and Associates drawings SK26 (9/22/82), GP-A16 (10/1/82), and preliminary station plans; 8-1/2 x 11 plans and sections (8/82).
- TAMS construction cost summaries dated November to December, 1982, from the DMJM/PBQD capital cost estimate.

The following individuals were contacted concerning architectural finishes:

- Donald L. Steeley - TAMS
- James Gilliam - MARTA

The following estimating references were utilized in checking the estimates.

- Means Building Construction Cost Data, 1982.
- Lee Saylor, Inc. Current Construction Costs, 1982.

General Discussion

Due to the conceptual nature of the drawings, a detailed estimate check could not be performed without numerous assumptions. Consequently, the estimate check was performed by checking the quantities for each work item in the TAMS' estimate for the two typical stations, i.e., Western/Wilshire (single level station) and Fifth and Hill (over-under station). The unit prices were checked only for the Western/Wilshire Station and then applied to the Fifth and Hill Station. Similarly, the head house costs were checked for unit prices.

The only question in the TAMS estimate is the derivation of total cost per square foot for the Western and Fifth and Hill stations and the subsequent application of these unit costs to the remaining stations. Kellogg Corporation could not verify the 23,140 square feet, nor the 50,800 square feet that TAMS used to derive the square footage unit prices that were then applied to the other stations. Likewise, Kellogg Corporation could not determine how TAMS established square footages for the remaining stations. This analysis assumed the square footages were correct, but Kellogg Corporation recommends that this question be addressed by TAMS, because it could lead to a large deviation in the estimated cost.

Findings and Conclusions

Assuming that the question of square footages and unit prices can be supported by TAMS, the TAMS estimate appears reasonable. The quantities and unit price check for the station finishes varied from the TAMS estimate, but overall, the Kellogg Corporation estimate was only five percent higher than the TAMS estimate. This five percent difference is reasonable given the conceptual nature of the design. When applied over all the stations, the five percent difference would add approximately $1.35 million to the station finishes.

Net change: add $1,350,000.

SECTION 5-E

STATIONS - MECHANICAL AND ELECTRICAL

Description

This item includes the cost of mechanical and electrical work in the stations. Excluded from this item but addressed elsewhere in this document are the costs of mechanical and electrical work in other types of structures.

Basis of Analysis

An analysis of the cost estimate of the station electrical/mechanical was made by reviewing the cost backup prepared by TAMS. Interviews with Jerry Chaing (electrical engineer) and Don Steely (cost engineer) of TAMS were conducted to determine some of the basis of their cost data.

The information was then evaluated based on Kellogg Corporation's experience and nationally recognized cost data (Means and Lee Saylor). Some actual cost estimates on motor control center equipment were used as well as the opinion of an outside expert in the HVAC installation.

General Discussion

There are 16 passenger stations to be constructed on the project. Thirteen of these are single level stations and the remaining three are two-level or over-under stations.

Two emergency vent shafts, each containing two fans, are located at single level stations without a crossover. Four emergency vent shafts, each containing two fans are located at over-under stations without a crossover. At single level stations with a crossover one vent shaft has an additional fan and two vent shafts, each have an additional fan at over-under stations with a crossover.

With the exception of two stations, each station contains a traction power substation. (See the diagram in Appendix E for location of the vents, crossovers and traction power substations.)

Power is supplied to the stations at 34.5 KV and is shared with the traction power substations. Each station contains stepdown transformers for auxiliary power and traction power. The power feeder will be furnished by the power company. The necessary supply side switchgear (two line breakers and a tie breaker) will either be purchased by SCRTD or supplied by the power company and amortized in the power rate structure.

TAMS prepared the estimate for the architectural/mechanical/electrical work on the stations. This section deals only with the mechanical and electrical costs. A detailed estimate was prepared for the western station and the cost per square foot was applied to all other single level stations. For the over-under stations, the single level station unit costs for mechanical and electrical features were increased by 50 percent. Fifth and Hill was used as the typical over-under station.

A separate discussion of each area is presented below:

Electrical. The electrical estimate was made in two parts i.e., auxiliary power and motor control centers. Auxiliary power includes the building transformer's distribution switchgear and internal building wiring and devices (including lighting). Motor control centers include the starters, wiring, and motors for the station mechanical equipment and vent shaft emergency exhaust fans.

Traction power substation feeders are included in the traction power estimate prepared by Kaiser Engineers. No allowance was made for the supply breakers in event they must be furnished by SCRTD. This could amount to approximately $250,000 per station, if required. No addition to the estimate has been made for this item.

Unit pricing for the auxiliary power estimate was obtained from Jerry Chaing and the Means Mechanical and Electrical Cost manual. Generally, the pricing is reasonable though conservative. Two discrepancies appear: 1) the line item, motor control centers is added to the auxiliary power and is also in the motor control center estimate, thereby doubling up these costs; and 2) the lighting estimate is based on 50,000 square feet rather than 23,140 square feet. These items result in a reduction of approximately $250,000 on the auxiliary power estimate.

Unit pricing for the motor control centers was obtained from the Westinghouse Quick Selector. The motor control center prices are grossly overstated resulting in a cost reduction of approximately $400,000 for the western station.

Mechanical. The mechanical estimate is divided into four elements:

- Mechanical (elevators and escalators)
- HVAC
- Fire protection system
- Plumbing and sewage

The unit prices for elevators and escalators are based on actual quoted prices and appear to be very conservative. In applying the prices to the over-under stations, the elevator costs were priced on a vertical foot basis resulting in an overstatement of costs of approximately $100,000 for each over-under station. The basic elevator cost should increase only approximately 3 percent per foot above a basic height of ten feet.

TAMS utilized the Means cost guide in computing HVAC unit prices. The resulting total cost per square foot for HVAC is approximately $60. There are some overstatements of cost such as the chilled water and condenser water pumps (approximately $130,000). An addition of $238,000 for hangers, louvers and diffusers is very high since hangers are already included in the ductwork price. A reduction of $150,000 would be reasonable to offset this duplication. The duct work prices are questionable regarding the manner in which they were calculated.

A total price reduction of $300,000 on the HVAC system would still result in a conservative price. With the amount of detail provided in the HVAC drawings, more accuracy should have been obtained in the original estimate, particularly regarding ductwork and chill water piping quantities.

The fire protection system prices are derived from Means. The prices presented are reasonable, though conservative.

The plumbing and sewage prices utilized in the estimate are also derived from Means and do not include fixtures, water fountains, etc. A price per square foot of $3.59 was estimated which is a bit understated. For the purposes of this analysis, a price of $7.50 per square foot is considered more reasonable.

Findings and Conclusions

The prices derived for the mechanical and electrical systems are in general, very conservative. Information presented on the drawings was, in most cases, quite detailed and a more accurate estimate could have been produced. In many cases, actual price quotations could have been obtained and a more accurate estimate of unit prices would have resulted. It is apparent that some of the unit prices were picked out of standard estimating manuals without sufficient analysis or adequate knowledge of the equipment being priced. In most cases, this resulted in prices being greatly overstated.

The method of applying the costs calculated for the western to the other stations was reasonable. A summary of costs is presented in the table below. In summary, the reasonable cost reduction for the mechanical and electrical results is approximately a 17 percent reduction in these costs. This reduction would be approximately $875,000 per single level station (13 each) plus $1,620,000 per over-under station (3 each) or a total of approximately $16,235,000.

STATION ANALYSIS - ELECTRICAL/MECHANICAL

Fifth and Hill - Over-Under

	Per Estimate	Revised
Mechanical (Elevator and Escalator)	$3,071,200	$2,948,000
Electrical (Auxiliary)	2,635,000	2,257,500
Electrical (MCC)	1,096,000	170,475
HVAC	2,142,000	1,692,000
Fire Protection	447,000	447,000
Plumbing and Sewage (@ 7.5/sq. ft.)	125,000	381,000
	$9,516,200	$7,895,975
Difference due to M/E =	$1,620,225	
Revised Cost/SF =	$208	
Percent Reduction = 17%		

Western

	Per Estimate	Revision
Mechanical (Elevator and Escalator)	$1,204,000	$1,204,000
Electrical (Auxiliary)	1,757,000	1,505,000
Electrical (MCC)	528,000	113,650
HVAC	1,428,000	1,128,000
Fire Protection	298,000	298,000
Plumbing and Sewage (@ 7.5/sq. ft.)	83,000	175,000
	$5,298,000	$4,423,650

Difference due to M/E = $874,350
Revised Cost/SF = $254
Percent Reduction = 17%

Some items that were not specifically noted in the electrical and mechanical estimates were:

a) Power factor correction equipment

b) Emergency power and lighting systems

c) Temporary light and power during construction

d) Startup and testing costs.

Due to the conservative nature of the estimates, the estimated cost should adequately cover the above items, though these items need to be treated as separate line items.

Net change: Deduct $16,235,000

SECTION 5-F

CROSSOVERS, POCKET TRACKS AND TAIL TRACK

Description

This item includes a review of the construction costs to build the structural portion of the crossovers, the dead train storage areas (pocket tracks), the North Hollywood tail track, and the cut-and-cover section between Union Station and the main yard. This item does not include cost allowances for track work or electrical/mechanical or other systemwide facilities.

Basis of Analysis

The documents reviewed in preparation of this estimate were as follows:

- The DMJM/PBQD pre-preliminary capital cost estimate.
- The metro rail starter line schematic diagram dated December 28, 1982.
- The geotechnical report and drawings.
- Sketch of the north tail track dated January 3, 1983.
- Milestone 3 route alignment alternative drawings.

Site visits to the various crossovers, pocket tracks, cut-and-cover section, and the north tail track were made in early March 1983.

General Discussion

There are a total of seven crossovers, two pocket tracks and one tail track. The dimensions of these structures were defined by obtaining the length from the DMJM/PBQD length analysis spread sheet contained in the DMJM/PBQD estimate, and equating the width and depth to adjacent station dimensions. The length of the box section adjacent to Union Station was computed from the schematic diagram with adjustments for actual station and crossover structure lengths.

Unit costs for these structures were obtained by extrapolating the applicable unit prices from the adjacent stations.

The crossover, pocket track, and box section estimates provide shell structures only. The north tail track estimate provides a shell plus a lump-sum allowance for some shop and repair facilities.

Contract packaging is covered in another section of this report. This is an area however, where interface problems resulting in cost increases could occur without prudent scheduling and contract packaging.

Findings and Conclusions

The pre-preliminary estimate for crossovers and pocket tracks is 25 percent lower than our estimate for these facilities. Kellogg Corporation is in agreement with the estimate for the North Hollywood tail track, if the allowance of $4,762,000 for mechanical and electrical facilities is proper. For the box sections between Union Station and the main yard, Kellogg is nearly double the current estimate. This is partially due to quantity differences and the fact that part of this reach was estimated by DMJM/PBQD as "dual track at grade" which is not in accordance with the SCRTD schematic diagram.

In summary:

- Crossover structures are approximately $7,700,000 low in total.
- Pocket tracks are approximately $6,500,000 low in total.
- North tail track - no recommended change in price.
- Box sections adjacent to Union Station are approximately $7,200,000 low in total.

Net change: add $21,400,000.

SECTION 5-G

LINE VENT STRUCTURES - CITY AND MOUNTAIN

Description

This item includes an estimate for the structural portion of the three city line vents (soft ground) and the two mountain vents (hard rock). This item does not include the fans or related electrical/mechanical equipment. An allowance was made, however, for the hoist and hoist house.

Basis of Analysis

The following documents were reviewed in the preparation of this section of the report:

- The DMJM/PBQD pre-preliminary capital cost estimate.
- The geotechnical reports and drawings.

The following individuals were interviewed regarding various existing geological and jobsite construction conditions and problems:

- John E. Moss - DMJM/PBQD - Consultant
- Charles J. Proctor - SCRTD

A site visit that included observations of the probable vent structure locations was made. This site visit included a thorough examination of rock cut exposures of the many Santa Monica mountain outcroppings.

General Discussion

The downtown or soft ground vent shaft structures were estimated by prorating or extrapolating unit costs developed in detail on similar features of the stations and other cut-and-cover structures. The mountain or hard rock vent shaft structures were estimated by "crewing up" and estimating in detail, the various structural features of the vent shafts.

The detailed estimates for both types of vent shafts are included in Appendix G of this report.

Findings and Conclusions

In general, the pre-preliminary capital cost estimate for both the downtown and mountain vent shafts exceed Kellogg's estimates. The primary differences in the estimates are as follows:

- The pre-preliminary capital cost estimates for both the downtown and mountain vents contain several mathematical errors and extension omissions.
- For the soft ground or downtown estimates, Kellogg Corporation is in agreement with the pre-preliminary estimate as presented. (For the correctly extended three soft ground vents. The pre-preliminary estimate total exceeds the Kellogg Corporation estimate by $1,250,000.)
- Each downtown vent shaft has an allowance of $200,000 for architectural finishes. This seems extremely high for a small non-public structure. Kellogg included a total of $30,000 for the three structures for a net savings or deduct of $570,000.
- Utility support allowance seems very high for this small street excavation area of the downtown shafts.
- The pre-preliminary estimate for the mountain shafts failed to extend the earthwork section unit costs to the total. Incorporating this correction, the pre-preliminary estimate exceeds Kellogg Corporation's estimate by approximately $2,000,000 total for both shafts. The pre-preliminary estimate as presented is $300,000 higher than Kellogg's estimate.

Net Change: Deduct $870,000

SECTION 5-H

VENT STRUCTURES - MECHANICAL AND ELECTRICAL

Description

This portion of the estimate includes the mechanical portion for all vent shafts and the mechanical/electrical portions for the vent shafts which are not located at stations. Vent electrical at the stations is included in the station estimates.

Basis of Analysis

An analysis was made of the pre-preliminary estimate and backup information for each of the items. Discussions were held with the estimators from DMJM/PBQD to answer questions. Reasonableness of the estimates was checked using the Means and Lee Saylor estimating manuals.

General Discussion

Unit prices were established for the vent shaft mechanical equipment based on relatively detailed specifications. Prices for each type of shaft i.e., over-under station, single level station, over-under crossover and single level crossover are shown on the DMJM/PBQD tunnel vent summary sheet, a copy of which appears in Appendix H. The number of shafts per reach was checked and found to be accurately stated in the summary sheet.

For the vent shafts not located at the stations, a lump-sum electrical price of $300,000 was used. This price should be adequate. The line vent structural, architectural and electrical is shown in the last column of the summary sheet. It appears that the last column also includes the mechanical work. This was determined by analysis of the backup data. The line vent mechanical column, therefore, is redundant.

Findings and Conclusions

No problems were found with the emergency vent shaft mechanical estimates except in the line vents. The mechanical work appeared to be doubled resulting in a 2.7 million dollar over-statement.

Net change: deduct $2,700,000.

SECTION 5-I

UTILITIES

Description

This item includes costs to support, maintain, relocate and restore utilities overlying and adjacent to excavations for subway structures. Excluded from this item are costs for surface restoration for these utilities, which costs are addressed elsewhere in this document.

Basis of Analysis

The following documents have been reviewed concerning utilities:

- The DMJM/PBQD estimate.
- Various composite utility drawings.
- Various correspondence, tables, sketches, and estimates proposed by the City of Los Angeles, Department of Public Works, Bureau of Engineering.
- Preliminary drawings.

The following individuals have been interviewed by Kellogg Corporation concerning utilities:

- Howard J. Chaliff - DMJM/PBQD
- James E. Crawley - SCRTD
- Robert Cutlip - TAMS
- Donald King - SCRTD
- Al Levy - SCRTD
- Vern Montgomery - City of Los Angeles

General Discussion

The DMJM/PBQD estimating effort has been limited due to, until very recently, constant changes in station and guideway locations. Estimates for utility support and maintenance costs have been prepared based upon historical percentage

ranges from other systems, particularly Baltimore and WMATA. Utility relocation estimates have been prepared and coordinated by the City of Los Angeles Department of Public Works with input from some of the private utility companies.

Findings and Conclusions

The current estimate for utility support and maintenance is based upon a percentage range (2 to 5 percent) of the station cost. This estimate excludes other adjacent open-cut and cut-and-cover areas.

The current estimate for utility relocation and restoration was developed for most stations but also excludes adjacent open-cut and cut-and-cover areas.

No allowance is included for utility work overlying or adjacent to tunnel excavation.

No allowance has been included for support, maintenance, relocation/closure, or restorations of private property in public space (i.e., sidewalk vaults, elevators, store fronts constructed under revocable permits).

After adjustments are made for the exclusions described above, Kellogg Corporation considers the estimate allowances made to be within a reasonable range considering the lack of specificity indicative of the current level of design. During the final design phase, the estimated amounts could vary appreciably from those currently in use. Utility costs should be considered highly sensitive to final location and design and a target for value engineering alternative studies.

The utility estimate should be adjusted as noted below. Supporting computations are included in Appendix I.

Current Total: Support	$8,571,400
Current Total: Relocation	25,000,000
Current Total Utility Work	$33,571,400

Deduct duplication for surface restoration	-$4,854,700	
Add cut-and-cover open-cut support	+ 5,627,000	
Add cut-and-cover open-cut relocation	+ 11,043,000	
Adjusted Total Utility Work	$45,386,700	
Net Change: Add	$11,815,300	Call $11,815,000

SECTION 5-J

UNDERPINNING

Description

This item includes costs to underpin, support, and restore structures overlying and adjacent to excavations for subway construction. This item excludes underpinning, support and restoration of utilities, the cost of which is addressed elsewhere in this document. For convenience, construction cost of the Bluffside Bridge is addressed in this item.

Basis of Analysis

The following documents have been reviewed concerning underpinning:

- The DMJM/PBQD estimate.
- The estimate summary matrix.
- Preliminary drawings.
- Drawings summarizing existing building and foundation sizes and types adjacent to the major structures.

The following individuals have been interviewed concerning underpinning.

- James E. Crawley - SCRTD
- Howard J. Chaliff - DMJM/PBQD
- Stephen S. Uy - DMJM/PBQD
- John Bond - DMJM/PBQD

All cut-and-cover and open-cut sites were visited by Kellogg Corporation during the engagement. Specific sites were visited to obtain a general observation of underpinning considerations. These include:

- Santa Ana Freeway/Los Angeles River
- Union Station

- First and Hill Station
- Fifth and Hill Station
- Seventh and Flower Station
- North Hollywood Station

General Discussion

Due to the current stage of design and political sensitivity, underpinning cannot be accurately defined until the final design phase. For these reasons, DMJM/PBQD has been limited to using "plug" values for underpinning estimates. Kellogg Corporation review of this item includes an assessment of reasonableness of the values used and a check for apparent omissions and duplications.

Findings and Conclusions

The estimate provides plug numbers for three major structures:

- Underpinning the Santa Ana Freeway/Los Angeles River crossing ($20,000,000).
- Underpinning the Hill Street Bridge in Reach No. 2 ($250,000).
- Construction of the Bluffside Bridge to provide access to the Universal City Station ($3,000,000).

The estimate provides plug numbers for underpinning various buildings overlying or adjacent to cut-and-cover subway construction in the amount of $21,250,000.

The estimate provides no allowance for underpinning in areas to be tunneled and some cut-and-cover areas.

The estimate apparently duplicates approximately $4,087,000 of underpinning costs included under the station shell excavation item.

The estimate provides no allowance for underpinning the railroad tracks at Union Station ($120,000/track) and at North Hollywood Station ($125,000/track).

Considering the current stage of design, the estimate values appear reasonable. During the final design phase, the final estimated amounts could vary appreciably from those currently in use. Underpinning costs should be considered highly sensitive to final location and design and a target for value engineering alternative studies.

The underpinning estimate may be adjusted as follows:

Current total		$44,500,000
Add railroad tracks	+1,210,000	
Deduct duplications contained in station shell excavation	-4,087,000	
Add for cut-and-cover areas not presently included	+1,720,000	
Net change		$-1,157,000
Adjusted total		$43,343,000

Detailed calculations of the above are contained in Appendix J.

SECTION 5-K

TRAFFIC MAINTENANCE

Description

This item includes costs to maintain and/or divert vehicular and pedestrian traffic, maintain access to properties adjacent to open-cut and cut-and-cover excavations, and control access to contractor's work and storage areas at or near the excavation sites. Excluded from this item are costs of flagmen used for traffic control on an isolated basis, and the costs of street and sidewalk decking, both of which are addressed elsewhere in this document.

Basis of Analysis

The following documents have been reviewed concerning traffic maintenance:

- The DMJM/PBQD estimate.
- Preliminary drawings.
- Technical Report: Traffic Control Policies During Construction, dated February, 1983, prepared by the Department of Transportation, City of Los Angeles.

The following individuals have been interviewed by Kellogg Corporation concerning traffic maintenance:

- James E. Crawley - SCRTD
- Al Levy - SCRTD
- Charlie J. Proctor - SCRTD
- Nadeem Tahir - SCRTD
- Joseph Kennedy - City of Los Angeles

In addition, Kellogg Corporation personnel visited the sites of construction to observe traffic conditions and maintenance considerations.

General Discussion

The success of a major urban construction project such as the SCRTD Metro Rail System depends heavily on the ability to minimize the impact of construction on existing heavy traffic movements. Elements to be considered include:

- Vehicular and pedestrian traffic demand.
- Ability to satisfy traffic demand and/or divert traffic as conveniently as possible to adjacent parallel streets.
- Provide access to businesses, residences, and public buildings neighboring the construction.

Findings and Conclusions

Traffic along the entire route is heavy, particularly during peak hours and in the central downtown business district.

There currently exists an admirable spirit of cooperation between the City of Los Angeles and SCRTD. The Technical Report: Traffic Control Policies During Construction represents a doable plan to construct the subway while maintaining traffic flow.

The current estimate for traffic maintenance allows only $371,150 for the entire system.

It is Kellogg Corporation's opinion that a more appropriate estimated allowance for traffic maintenance is $12,544,500 which is $12,173,350 more than the current allowance. A detailed calculation of this amount is contained in Appendix K.

Net Change: Add $12,173,000

SECTION 5-L

DEWATERING

Description

This item includes costs to dewater the open-cut and cut-and-cover excavations for subway construction. Excluded from this item are the costs of tunnel dewatering which are included elsewhere in this document.

Basis of Analysis

The following documents have been reviewed concerning dewatering:

- The DMJM/PBQD estimate.
- The geotechnical report.
- Preliminary drawings.

The following individuals have been interviewed concerning dewatering:

- James E. Crawley - SCRTD
- Howard J. Chaliff - DMJM/PBQD
- John E. Moss - DMJM/PBQD - Consultant

General Discussion

Most of the subway excavation will occur in areas above the permanent water table and, therefore, extensive well-point or deep-well systems should not be required. Water to be encountered during construction will include perched and trapped water, surface runoff, and water used during construction. Planned control of this water must be considered.

Findings and Conclusions

The DMJM/PBQD estimate provides an allowance of $2,650 per month for each station for dewatering. This allowance totals $824,150 for the entire project.

It is Kellogg Corporation's opinion that a dewatering maintenance allowance should be made for at least $12,000 per month per station and a minimum lump-sum allowance of $20,000 per station to cover settling basins, sumps, trenches and hoses. This allowance totals $4,052,000 for the entire project or $3,227,850 more than the current estimate. Details of this calculation are contained in Appendix L.

Net Change: Add $3,228,000

SECTION 5-M

TRACKWORK

Description

This item includes the trackwork for the entire Metro Rail Project. The trackwork in the main yard includes both ballasted railroad and transit track, at-grade. Trackwork through the tunnels and stations is the direct fixation type, with concrete-embedded turnouts and crossovers.

Basis of Analysis

The following documents were reviewed as part of the trackwork analysis:

- The DMJM/PBQD estimate.
- The Metro rail starter line schematic diagram dated December 28, 1982.
- Metro Rail Project Milestone 10 Report.
- Milestone 3 route alignment alternative drawings, sheet 1 to 20.

Trackwork was discussed with the following individuals:

- Howard J. Chaliff - DMJM/PBQD
- John Bond - DMJM/PBQD
- George Stanske - DMJM/PBQD

The following references were utilized in checking trackwork pricing.

- DMJM/PBQD unit price data relative to trackwork (includes data from Means, Dodge and Lee Saylor cost guides, bid and estimate data from the Boston and Baltimore Rapid Transit systems, and quotes from several rail contractors).
- Denver RTD trackwork estimates.
- Dravo Corporation bid and actual cost information from construction of the San Francisco BART system.

- 1982 Dodge Guide.
- Railroad Builders, Inc., a trackwork contractor.

General Discussion

Track construction on the project can be divided into two general categories: ballasted, at-grade and direct fixation. In reviewing the DMJM/PBQD estimate, it appears that the subway track is considered to be direct fixation with floating slab, which is considerably more expensive than direct fixation. George Stanske, DMJM's trackwork expert, indicated that the ultimate design will include a combination of direct fixation, resiliently supported, and floating slab trackwork, based upon vibration and accoustical considerations. The January 1983 estimate was to be based upon all underground trackwork being direct fixation. Design criteria for the pre-preliminary trackwork estimate is summarized as follows:

- Subway-Transit Track

  115-pound continuous welded rail, direct fixation
  switches on timber ties embedded in concrete

- At-Grade Ballasted-Transit Track

  115-pound continuous welded rail
  concrete ties

- At-Grade Ballasted-Railroad Track

  115-pound continuous welded rail
  timber ties

DMJM/PBQD's method of pricing the direct fixation track was to use one price per linear foot of track which would be sufficient to cover costs for concreted turnouts and crossovers in the main line. Kellogg Corporation developed separate prices for the crossover features and the subway track.

Kellogg Corporation performed a system feature take-off to check quantities for trackwork construction. No major differences were discovered, although the crossover between Union Station and the main yard is not called out as such. This take-off appears in Appendix A.

A rough take-off was performed in the main yard from the drawings contained in the milestone 10 report, which may not be the basis of the January 1983 estimate. Crossover and turnout quantities checked closely, however track quantities for both railroad and transit track appeared to be higher than Kellogg could compute. In reviewing the estimate for the main yard, the DMJM/PBQD quantities were used in conjunction with Kellogg's unit prices.

Findings and Conclusions

In general, pricing for trackwork appears to be somewhat inflated. This is particularly so for the direct fixation track which accounts for over 70 percent of the total trackwork estimate. DMJM/PBQD's composite unit price for direct fixation track with crossovers is $228.00 per linear foot total cost or $197.00 per linear foot direct cost. Kellogg has derived a direct cost for direct fixation rail of $125.00 per linear foot with separate pricing of concrete embedded No. 10 double crossovers at $300,000 each. This accounts for the major portion of the difference between the Kellogg Corporation and DMJM/PBQD estimates.

Inasmuch as rapid transit trackwork is a specialized type of construction, and the unit prices developed by both DMJM/PBQD and Kellogg Corporation are based primarily upon estimates and rather old historical data, it is strongly recommended that additional and more recent data be obtained to utilize in pricing the final preliminary estimate. Actual bid tabulations from several of the more recently constructed transit systems would be extremely helpful in developing cost data sensitive to the competitive marketplace.

In dealing with bid prices and historical price data, it is important to be aware of possible bid unbalancing, and to reduce costs back to the direct cost level, without contractor mark-ups. It is unclear whether DMJM/PBQD was dealing with direct cost or total cost unit prices from other transit projects. In one instance, an additional 15-1/2 percent mark-up was applied to the $228.00 per linear foot unit price for direct fixation rail, which already included 15-1/2 percent mark-up.

Details of Kellogg's trackwork analysis are contained in Appendix M. A summary of our findings is presented below.

- Main yard - Deduct $3,510,000
- Reach No. 1 to 14 - Deduct $10,865,000
- North Hollywood Rail Track - Add $24,000

Net Change: Deduct $14,351,000

SECTION 5-N

TRACTION POWER

Description

This item includes the costs of traction power equipment installations and construction of separate structures to house this equipment. Excluded from this item are the costs of traction power structures which are structural appendages of subway stations.

Basis of Analysis

Review of a comprehensive estimate submitted by Kaiser Engineers and discussion of the system with their engineers.

General Discussion

The traction power system supplies 700 volts direct current to power the trains. The system consists of 19 traction power substations. Of these 19 substations, 14 are located at train stations. A separate structure is required to be built for the five remaining substations not at a station.

Kaiser Engineers presented a very comprehensive estimate for the traction power system. The format of the estimate and its readability is excellent. Unit prices were derived by Kaiser based on historical data from similar systems.

The same problem regarding power service exists on the isolated traction power substations as exists on the stations. This problem is the unresolved question regarding who supplies the incoming electrical service equipment. The additional cost for this equipment will be approximately $250,000 for each of the five isolated substations, if they are in fact to be supplied by SCRTD. No adjustment has been made to the estimate for this item.

In addition to the traction power substations, a cost of four buildings for housing the isolated stations is included at approximately $800,000 per building. The cost for the buildings is $106.53 per square foot.

Findings and Conclusions

There are no problems with the traction power estimates.

Net changed: $0.

SECTION 5-O

MAIN YARD

Description

This item includes an analysis and estimate review of the following main yard facilities:

- Demolition
- Site preparation
- Structural
- Roads and pavement
- Fencing
- Yard lighting

This item does not include the main yard buildings, trackwork, fixed equipment, or yard vehicles, which are addressed in other parts of this report.

Basis of Analysis

The following documents were reviewed in the preparation of the estimate for this section of the report:

- The DMJM/PBQD pre-preliminary capital cost estimate.
- Drawings and sketches.
- Kellogg Corporation project photographs.

A thorough project site reconnaissance of all existing trackwork and structures as well as the areas for proposed construction features was performed.

References used for estimating the proposed facilities are as follows:

- Kellogg Corporation cost records.
- Building construction cost data publications.

General Discussion

The design and general information received for the construction of the main yard facilities was very preliminary. The quantity take off units however, are presented in detail indicating that the yard limits and general scope is well defined. Absent a design or scope definition, an independent take off was not performed. This estimate was prepared using the quantities stated in the pre-preliminary estimate.

The estimate check was performed on a unit price basis and the detailed backup sheets are included in Appendix O of this report.

Findings and Conclusions

In general, Kellogg Corporation finds that the pre-preliminary estimate for the main yard features estimated in this section is quite generous. The cost variance by feature is as follows:

- Demolition $3,500,000 high (primarily in track removal.)
- Site preparation $300,000 high.
- Structural $300,000 high.
- Roads/paving $300,000 high.
- Fencing - agree.
- Lighting $100,000 low.

Net Change: Deduct $4,300,000

SECTION 5-P

BUILDINGS - STRUCTURAL AND ARCHITECTURAL

General Description

This section includes a review of the construction costs for the following buildings: 1) main shop building; 2) maintenance of way building; 3) transportation building; 4) car cleaners building; 5) test building; 6) exterior car wash building; 7) traction power building and 8) the control building. The mechanical and electrical costs for these buildings are analyzed in a separate section.

Basis of Analysis

The following documents were reviewed:

- SCRTD Metro Rail Project EIS Capital Cost Estimate prepared by DMJM/PBQD dated December 3, 1982 and revised on January 7, 1983.
- Preliminary Draft Report for the Development of Milestone 10: Fixed Facilities, dated February 1983.

The following references were utilized for unit prices:

- Means Construction Cost Data, 1982.

General Discussion

Shop and yard buildings were estimated by DMJM/PBQD based on the conceptual designs. Gross unit prices were applied to the individual building square footages. The Kellogg Corporation analysis reviewed these figures for accuracies.

An analysis of the unit prices was performed for the various buildings, except the mechanical and electrical prices which are reviewed in Section 5-Q. Realizing that the pre-preliminary estimate was based on conceptual designs, the unit prices for all the buildings, except the control building which are very conservative, are within a reasonable range for this stage of the design.

The control building estimate has exaggerated unit prices for "Special Construction" and "Fixed Equipment" which are incorrectly extended yielding $196,000. The correct extension of these items would yield nearly $2,000,000. The $196,000 cost for these items currently in the total cost for the control building is a reasonable allowance.

Findings and Conclusions

The unit prices for all the buildings are conservative, but reasonable except the control building. The control building estimate for "Special Construction" and "Fixed Equipment" have exaggerated unit prices, but the overall dollar value included in the estimate is reasonable.

Net Change: $0.

SECTION 5-Q

BUILDINGS - MECHANICAL AND ELECTRICAL

Description

This item includes the mechanical portion for all vent shafts and the mechanical/electrical for the vent shafts which are not located at stations. Vent electrical at the stations is included in the station estimates.

Basis of Analysis

An analysis was made of the estimate and backup information for each of the items. Discussions were held with the estimators from DMJM to answer questions. Reasonableness of the estimates was checked using the Means and Lee Saylor estimating manuals.

Findings and Conclusions

The building estimates were reasonable for a conceptual estimate with the exception of the control building. The main shop and maintenance of way buildings had no separate provisions for electrical or mechanical, though discussions with the engineers indicated that these costs were included in the overall building square foot allowance. A comparison of square foot unit prices is included in Appendix Q.

In the control building estimate, an incorrect extension of overstated unit prices resulted in a low estimate. A $25 per square foot figure for electrical and mechanical was applied for the control building resulting in a net addition of $128,000.

An estimate was prepared for the north tail track building for a total of $4,762,000 for architectural, mechanical and electrical. This estimate was based on conceptual information and analysis as to reasonableness was performed.

Net change: add $128,000.

SECTION 5-R

PARKING

Description

This item includes the costs for the construction of two at-grade parking lots and five multi-story parking facilities. Costs for property acquisition are not included.

Basis of Analysis

The documents reviewed in preparation of this estimate are as follows:

- The DMJM/PBQD pre-preliminary capital cost estimate.
- The metro rail starter line schematic diagram dated March 28, 1982.

These documents present reach locations, the number of parking facilities and parking space requirements.

A site examination of possible garage/parking lot locations was made in early March 1983.

References used for estimating the parking facilities are as follows:

- Kellogg Corporation cost records.
- Building construction cost data publications.

General Description

The two at-grade parking lots have been estimated at $2.50 per square foot. An independent estimate reveals that this unit price includes an allowance for the following facilities:

- Demolition
- Site grading/leveling
- Pre-compaction

- Base course/asphalt/stripping
- Fencing
- Bumpers/islands/landscaping
- Lighting

The five parking structures are defined only as to parking stall capacity for the various locations. This limits the degree of estimating to that of conceptual. DMJM/PBQD has included an allowance of $5,000 per parking space in their estimate, which is reasonable.

An early purchase and demolition of these sites for temporary use as contractor work/storage areas would aid the congestion problem for several contractors.

Back up estimating worksheets are included in Appendix R.

Findings and Conclusions

The allowances provided in the pre-preliminary estimate for parking facilities is adequate. This is based on minimum "no-frills" type of construction; an open, elevated type of structure, without HVAC and similar facilities.

As stated in the station shell section of this report, there appears to be a duplication of $15,000,000 for parking facilities, as the parking structures at the Fairfax/Beverly Station and the Universal City Station were included in the estimate twice; once in the detailed station shell estimate, and again on the reach summary sheets. This duplication is corrected in the station shell section of this report.

Net Change: $0

SECTION 5-S

CONTINGENCIES

Description

This item addresses an allowance for change orders, differing site conditions, etc., which cannot be foreseen even during final design. This item is in addition to the "design contingency" item included in the pre-preliminary estimate, which covers the uncertainties of costs due to the preliminary status of design.

Basis of Analysis

The Kellogg Corporation estimate for contingency is based upon experience from other transportation and heavy construction projects.

General Discussion

A design contingency allowance alone is inadequate for the SCRTD Metro Rail Project. The pre-preliminary estimate contains an allowance of 20 percent of the direct construction costs for "design contingencies." The SCRTD Estimating Methodology and Procedures manual states:

- "The design contingency is applied as an allowance for uncertainties of design during the earlier stages of design."
- "The need for this allowance disappears as the design progresses toward the 100 percent level."

The above translates to mean that at the time of construction contract document formation, all contingency allowances have been absorbed.

A contingency allowance during construction should be provided. The amount of such a contingency should consider the following criteria:

- The degree of subsurface exploration.
- The nature of the contract language as it pertains to the allocation of risks.
- The type of construction (tunnels, stations, above-ground structures, etc.)

Findings and Conclusions

Assuming a comprehensive subsurface investigation program is performed and resulting information is supplied to construction contractors, and equitable contract language is utilized, the contingency allowance should be applied as follows:

- Tunnel construction 15 percent
- Underground station construction 10 percent
- Surface construction 5 percent

The weighted average of 11 percent of the construction capital cost subtotal is recommended.

SECTION 5-T

CONTRACTOR MARK-UPS

Description

This item addresses those elements added to contractors' direct costs including:

- Field overhead cost.
- Home office general and administrative expense.
- Profit.
- Bond.

Basis of Analysis

The Kellogg Corporation estimate for contractor mark-ups is based upon experience from other transportation and heavy construction projects.

General Discussion

Each of the categories of indirect cost was examined in light of the types of work to be performed on the project. These were grouped into three categories: (1) tunnels, (2) stations, and (3) above-ground structures. Each of these three will have slightly varying percentage applications for overhead and general and administrative expense and large variation in percentage application for profit. The bond percentage will stay the same for all categories of work.

Field overhead cost will increase, as a percentage of the direct cost, as the amount of work being performed by a contractor with his own forces increases. Therefore, the field overhead, as a percentage, would be expected to be higher on the tunnel and station work, than on the above-ground structures where more of the work would be subcontracted. On heavy construction projects, the field overhead cost runs from 17 to 22 percent of direct costs. On surface structures, it would be expected to be less than that. Since 4.2 percent is being allocated to wrap-up insurance, which will be purchased and paid for by the owner, the contractor's overhead should be reduced by that much, or slightly more, based on the

premise that the owner's wrap-up insurance is cheaper than having the contractor pay for the same coverage. For this project, a weighted 16 percent would be reasonable for field overhead, applied to total direct costs.

General and administrative expense runs between 6 and 12 percent of the total cost for contractors involved in heavy and building construction. In the case of specialty contractors, such as electrical, it could run as high as 20 percent. On this project, an average of 7 percent should be applied to the sum of the direct and field overhead costs.

The profit applied by contractors varies considerably based upon the complexity of the project, the duration, amount of risk labor the contractor will perform with his own forces, and the competitive market. Tunnel work would command a profit markup of 20 to 30 percent, station work 10 to 12 percent, and surface structures 6 to 7 percent. A weighted profit for this project would be 15 percent applied to the subtotal of direct costs, field overhead cost, and home office general and administrative expense.

Bond premium rates start at 0.75 percent and decrease according to a schedule of contract value to 0.40 percent for contract values in excess of $10,000,000. An additional factor influencing bond premium rates is contract duration. An appropriate rate for this project is 0.50 percent applied to the subtotal of direct costs, field overhead cost, home office general and administrative expense and profit.

It is assumed that gross receipts taxes are not applicable to this project.

Findings and Conclusions

The pre-preliminary estimate allows only 10 percent for overhead, 4 percent for profit, and 1 percent for bond, which compounds to a total markup of 15.5 percent. No allowance was included in the pre-preliminary estimate for home office general and administrating expense.

Kellogg Corporation recommends a total markup of 43.45 percent be applied to the contractors direct cost. This percentage is calculated as follows:

Direct cost of project	100%
Field overhead cost @ 16%	16.00
Subtotal	116.00%
General and administrative expense @ 7%	8.12
Subtotal	124.12%
Profit @ 15%	18.62
Subtotal	142.74%
Bond @ 0.5%	.71
Subtotal	143.45%
Less direct cost of project	100.00
Total markup	43.45

SECTION 5-U

ENGINEERING, DESIGN AND CONSTRUCTION MANAGEMENT

Description

This item addresses the design engineering and construction management allowances for the first phase of construction. This item does not cover SCRTD's costs for administration as this cost is addressed in the section entitled Agency Costs.

Basis of Analysis

Both the design engineering and construction management allowances were determined by evaluating cost records of the following projects:

- BART
- WMATA
- MARTA
- Denver RTD (estimate)

General Discussion

The allowance presented in the capital cost estimate provides for full design through contract document preparation. This allowance also provides for a modest design modification or change order organization throughout construction. Also included is a full range of construction management services by an independent construction management firm.

Findings and Conclusions

With the exception of the MARTA project, the average of the several recently constructed and estimated transit projects are in line with the percentage allowance contained in the pre-preliminary capital cost estimate.

The estimate for design/construction management as presented by DMJM/PBQD in the pre-preliminary is reasonable. We confirm the allowance of 13 percent of construction capital cost for design and construction management.

Net change $0.

SECTION 5-V

AGENCY COSTS

Description

This item addresses the costs for SCRTD's administration of the project. This item does not include design or general construction management costs which are addressed in the preceeding section.

General Discussion

This estimate of agency costs assumes that SCRTD will engage a general construction management firm to perform the overall field supervision of construction. SCRTD may elect to utilize the construction management organization in one of two ways:

- Restrict the construction management organization to field activities such as surveying, inspection and technical services (soils, concrete, geology, metallurgy and general quality control). In this case, SCRTD would provide the general supervisory personnel such as area managers, resident engineers and other field office staff. SCRTD's administrative costs in this type of arrangement would be approximately 5 percent of capital costs.

- Assignment by SCRTD of all of the field construction activities to the construction management firm. SCRTD, therefore, would maintain a minimum organization to function primarily as general overall supervisor. As general supervisor, SCRTD would render final decisions on major issues and generally coordinate all participating agencies - design, scheduling, construction management, contractors, utilities, etc. SCRTD's administrative costs for this level of effort would be roughly 3 percent of capital costs.

A compromise, and highly recommended alternative, would be to supplement the SCRTD staff with a small cadre of construction personnel experienced in underground transit work. This group would generally oversee the major activities of construction, scheduling, interfacing, proper change order administration, claim mitigation and early recognition of problems realized on previous projects.

Findings and Conclusions

The allowance provided in the pre-construction estimate of 5 percent of capital costs is adequate to cover a major role in construction management by SCRTD. If more of the construction management role is delegated to an outside entity, the agency costs will be reduced approaching a 3 percent level. A timely and proper staffing of the construction management organization would also reduce this cost.

Net Change: $0

SECTION 5-W

WRAP-UP INSURANCE

Description

This item normally includes builder's risk, general liability and workmen's compensation insurance coverage provided for all contractors with all premiums paid by the owner. This insurance normally does not include automotive insurance nor errors and omissions coverage for design, both of which must be purchased by the contractor.

Basis of Analysis

The basis of the analysis is limited to review of the SCRTD Metro Rail Project Estimating Methodology and Procedures manual, an informal interview with an insurance consultant, and previous experiences of several Kellogg Corporation employees involved in subway construction subject to wrap-up insurance programs. The report entitled "Insurance Alternatives Analysis for the Construction of the Southern California Rapid Transit District Rail Project" prepared by David Ashley, January 4, 1982 was not reviewed by Kellogg Corporation.

General Discussion

An effective wrap-up insurance program must consider the following:

- A clear definition of coverage and exclusions.
- A clear definition of management and administration of the program.
- Incentives to the contractor to minimize insurance losses.

Findings and Conclusions

Builder's risk insurance is apparently covered in two places in the pre-preliminary estimate: Wrap-up Insurance, and Contractor's Overhead. The Kellogg Corporation estimate excludes Builder's Risk Insurance from Contractor's Field Overhead.

Without clear definitions of the elements described under the General Discussion above, Kellogg Corporation cannot properly address this item and must apply the 4.2 percent factor currently used in the pre-preliminary estimate.

SECTION 5-X

ESCALATION

Description

This item covers the projected escalation of costs over the construction duration, from the stated value in current (mid-1982) dollars.

General Discussion

Pursuant to instruction received from SCRTD in the initial meeting prior to preparation of this check estimate, escalation was not to be computed or included. The estimate was to represent construction costs in mid-1982 dollars.

With a construction duration for this phase of work extending to 1990, Kellogg Corporation recommends that strong emphasis be placed on calculation of this cost element before total cost is established.

Findings and Conclusions

The estimate was prepared:

- Using mid-1982 prices.
- Escalation was excluded.

Net change: $0.

SECTION 5-Y

CONSTRUCTION CONTRACT PACKAGING

Description

This item addresses construction contract packaging of work but does not define specific variations of cost.

Basis of Analysis

The following documents have been reviewed concerning construction contract packaging:

- Preliminary drawings.
- A drawing entitled "Metro Rail Starter Line Schematic Diagram" dated January 3, 1983 and prepared by DMJM/PBQD.
- The geotechnical report.
- SCRTD contract unit descriptions dated March 1983.

The following individuals have been interviewed by Kellogg Corporation concerning construction contract packaging:

- James E. Crawley - SCRTD
- Donald King - SCRTD
- Howard J. Chaliff - DMJM/PBQD
- John E. Moss - DMJM/PBQD - Consultant

In addition, Kellogg Corporation traveled the entire route with specific emphasis on observing construction contract packaging considerations.

General Discussion

Construction contract packaging must consider and optimize the mix of the following criteria:

- Manageability by a single contracting organization.
- Scheduling integration to achieve systemwide completion milestones.
- Interface considerations between separate contracts.
- Geologic conditions: similarity as opposed to diversity.
- Jurisdictional boundaries between political subdivisions, and franchise boundaries between utility companies.

Findings and Conclusions

Construction contract packaging described most recently in SCRTD's Contract Unit Descriptions has eliminated most of the packaging problems presented in the earlier Schematic Diagram. By way of review, those earlier problems generally affected tunneling operations in the following areas:

- Reach No. 2 (over-under tunnel configuration).
- Reach No. 5 (tunneling interface with the Alvarado/Wilshire Station).
- Reach No. 8 (over-under tunnel configuration and starter tunnels requiring additional shafts or TBM's).
- Reaches No. 10 and 12 (tunnels on both ends of the packages requiring additional shafts or TBM's).

Additional costs of the above have not been evaluated since packaging and configuration have been recently revised. These costs and/or scheduling considerations would have been significant. For example, in the over-under tunnel configuration, the vertical portal relationship to station excavation and bracing was not addressed in the estimate or schedule.

The revised packaging presents manageable contract sizes attractive to general contractors and recognizes similarity of geological considerations. It is understood that construction scheduling is currently being re-analyzed by others, but if the present concurrency of tunneling operations is retained, the ability of the TBM manufacturing industry to provide TBM's on such a tight schedule must be analyzed.

Lack of detailed definition of packaging prevents analysis of interface considerations between separate contracts. This topic should receive a careful value engineering analysis.

No comparison between construction contract packaging and the jurisdictional boundaries between political subdivisions or franchise boundaries between utilities was made due to lack of data.

It is recommended that further evaluation of construction contract packaging considerations be performed early in the final design phase. This topic should be targeted for value engineering alternative studies.

APPENDIX

APPENDIX A - ESTIMATE ORGANIZATION

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To FILE

Date 3/10/83

From AWJ

Subject SCRTD/MR. pg 1

ESTIMATE ORGANIZATION:

1) OMJM/PBQD LETTER OF 1/6/83 TO SCRTD
   SUMMARY BY 14 DIRECT COST ITEMS PLUS INDIRECTS, ADMIN & CONTINGENCY COSTS.
   - DATA FROM 2'x2' SPREAD SHEET.

2) 2'x2' ESTIMATE SUMMARY SPREAD SHEET 1/3/82 (SIC) BY JTS/DFM.
   - DATA BY SUMMARY ITEM (IN ABOVE LTR) AND BY REACH NO.
   - REFERENCES TO PAGE NO. OF DETAILED ESTIMATE
   - SHEET SQUARED.
   - INDIRECTS ADDED @ BOTTOM.

3) MAIN YARD/ TML TRACK (TAB #1 - pg Y1-A TO Y53
   - INCLUDES TRACKWORK
   - " FIXED EQUIPMENT
   - " YARD VEHICLES.
   - " BUILDINGS
   - " ROADS & AT.

   } MAIN YARD

NORTH HOLLYWOOD TML TRACK Y-49 TO Y-54
TOTAL FWD FROM pg Y-5C (#23.5M)
(TRACKWORK NOT INCL - FROM G-17)
FIXED EQUIPMENT & YARD VEHICALS
pgs Y-44 TO Y-48
TOTAL FWD FROM pg Y-46 (#7.7M + 3.4M)

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date

From

Subject

pg 2

4) REACH (G-1 TO G-17) - 2ND TAB Pgs G-1 TO G-17
- G-1 DESCRIPTION OF REACH No. 1 TO 14.
- G-2 LENGTH ANALYSIS BY MAJOR PROJECT FEATURE BY REACH.
- G-3 TO G-16 REACH No. 1 TO No. 14 SUMMARY COST INFO.
- G-17 NORTH TAIL TRACK - TRACKWORK.

NOTE: TABS No. 1 & No. 2 SUMMARIZE THE FOLLOWING

- 1.0 GUIDEWAYS
- 2.0 STATIONS
- 3.0 PARKING
- 4.0 TRACKWORK
- 5.0 YARDS & SHOPS
- 10.2 TRACTION POWER STRUCTURE

EXCLUDED

- 6.0 CENTRAL CONTROL FACILITY
- 7.0 UTILITY RELOCATION
- 8.0 TRAIN CONTROL
- 9.0 COMMUNICATIONS
- 10.1 TRACTION POWER
- 11.0 FARE COLLECTION
- 12.0 VEHICLES

NOTE: YELLOW HIGHLIGHTED NUMBERS ARE THOSE CARRIED FORWARD TO 2'x 2' SUMMARY SPREAD SHEET.

---

5) TUNNEL (3RD TAB Pgs G-18 TO G-66)
DETAILED ESTIMATES FOR DUAL TRACK TWIN TUBE TUNNEL (# 384 M)
REACH 2 5 6 8 10 12 14.
DATA FORWARDED TO G-1 TO G-17.

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date

From

Subject

fg 3

6) UNDERPINNING (4TH MB, pgs G-67 to G-68)

G-67 @ C&C STATIONS
G-68 @ C&C CROSSOVERS
AMOUNTS NOTED L.S. WITH NO DEVELOPMENT OF BACK-UP.
FORWARDED TO G-1 TO G-17 (STATIONS) (ALSO TO STATION SHEET & FINISH SUMMARY SHEETS)
X-OVER UNDERPINING # FORWARDED TO G-1 TO G-17 SUMMARIES (UNDER GUIDEWAYS) AND TO Z×Z SPREAD SHEET "1.10 UNDERPINING".

NOTE: ADDITIONAL UNDERPINING IS ADDED TO G-1 TO G-17 WHICH DOES NOT APPEAR IN THIS SECTION:
G-3 UNDERPIN FREEWAY # 20M
G-4 UNDERPIN BRIDGE # 0.3M

7) TUNNEL VENT

MECHANICAL ONLY @ STATIONS & X-OVERS
MECHANICAL + STRUCT./ARCH/ELECT.

8) SPECIAL SYSTEMS.

ALL BY KAISER ENGRS

AUTOMATIC TRAIN CONTROL SYSTEM
COMMUNICATIONS SYSTEMS
FARE COLLECTION SYSTEM
AUXILIARY VEHICLES
PASSENGER VEHICLES
TRACTION POWER SYSTEM * ONLY ITEM (+ TRACTION POWER STRUCTURE) TO BE CHECKED BY KC.

INCLUDES NARRATIVE & SEMI-DETAILED COST.

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date

From

Subject

fg 4

7) STATION SHELL:
ITEMIZED 3-4 PAGE UNIT PRICE ESTIMATE FOR EACH OF 16 STATIONS.
SUMMARY SHEET IN FRONT OF SHELL CONST # CARRIED TO pgs G1 TO G-17

8) STATION FINISH:
ITEMIZED COST FOR EACH STATION BUT BASED ON ESTIMATED COST PER SF FOR A TYPICAL SINGLE LEVEL AND O/U STATION, APPLIED TO THE OTHER STATIONS.

BREAKDOWN:
ARCHITECTURAL
MECHANICAL (ELEVATORS/ESCALATORS)
ELECTRICAL (AUXILIARY SYSTEM)
ELECTRICAL (MCC)
HVAC
FIRE PROTECTION SYSTEM
PLUMBING/SEWERAGE.

SINGLE LEVEL STATIONS @ 291^{oo}/SF - 300^{oo}/SF
O/U STATIONS " @ 240^{oo}/SF.

NOTE: LAST 2 pgs PERTAIN TO PARKING STRUCTURES BUT DATA DOES NOT APPEAR TO BE CARRIED FORWARD. (PARKING CALCULATED @ $5000/CAR ON G-1 TO G-17)

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date

From

Subject

G 5

9) CONTROL BUILDING:
1 PAGE ESTIMATE ON 10,000 SF BLDG.
(EXCLUDES TRAIN CONTROL COSTS)
$1.5 M CARRIED TO T&T SUMMARY

10) UTILITY COSTS:
a) RELOCATION COSTS FOR UTILITIES @ STATION LOCATIONS ESTIMATED BY CITY OF L.A. = $21.7 M

b) RELOCATION & SUPPORT FOR CERT STRUCTURES
ALLOWANCE OF $ 3.3 M

c) $25 M TOTAL CARRIED TO T&T SUMMARY.

11) PARKING
UNIT PRICE OF $5000/CAR SPACE USED FOR 3-LEVEL PARKING STRUCTURE.

PRICING ACCOMPLISHED ON Pgs G-1 TO G-17 SUMMARIES

SIZE OF STRUCTURE (# CARS) NOT INDICATED ANYWHERE EXCEPT ON SUMMARY SHEET

AT GRADE PARKING PRICED AT $ 250/LF. (NO BACK UP FOR THIS UNIT PRICE)

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date

From

Subject

F 6

12) TRACKWORK

THREE SOURCES

- ESCALATED BID PRICES BOSTON TRANSIT
- COST WORKUP BY PB&D TRACK EXPERT
- RS. MEANS

USED WORKED-UP PRICE FOR FIXED RAIL @ $228.00/TF

USED MEANS + DODGE + SUB QUOTES FOR BALLASTED AT GRADE @ 75.00/TF

USED BOSTON PRICES FOR SWITCHES & X-OVERS IN MAIN YARD (BUT NOT BALLASTED TRACK (125.00/TF VS 75.00/TF USED)

SCRTD/MR — REF: 1/3/83 CONCEPTUAL SCHEMATIC 3/30/83

ESTIMATE CHECK

SYSTEM FEATURE TAKEOFF (EXCLUDING YARDS)

REACH No.	STA DESCRIPTION	1 TWIN BORE TUNNEL	2 TWIN CUT & COVER	3 CROSS-OVER	4 POCKET TRACK	5 STATION	6 TWIN OPEN CUT	7 QUAD C&C w/x-over	8 TOTAL LENGTH	9 TRACK LENGTH	10 PARK STRUCT.	11 VENT SHAFT STRUCT.	12 VENT SHAFT STR w/SHAFT	13 TRACTION POWER STRUCT
1	UNION STATION		945			660	—	792 (4)	2877	6338	1	1		
2	FIRST & HILL STA. / FIFTH & HILL STA.	7,324		460 (1)		681 / 681			9,046	18,092				
3	SEVENTH & FIGUEROA					740			740	1480				
4	ALVARADO					490			490	980				
5	VERMONT/WILSHIRE / NORMANDIE/WILSHIRE	14,768		920 (2)		567 / 672			13,927	27,854				1
6	WESTERN/WILSHIRE	10,980			1010 (1+2)	660			12,150	25,310				
7	LA BREA/WILSHIRE					660			660	1320				
8	FAIRFAX-WILSHIRE	7,237		920 (2)		935			9092	18,184	1			
9	BEVERLY-FAIRFAX					685			685	1370	1			
10	SANTA MONICA-FAIRFAX / LA BREA-SUNSET	16,162		460 (1)		660 / 630			17,392	35,984		1		
11	HOLLYWOOD-CAHUENGA				1250 (1+2)	655			1,885	5020				
12		16,154				—			16,154	32,308			2	2
13	UNIVERSAL CITY					630			630	1260	1			
14	NORTH HOLLYWOOD	10,688		460 (1)		672			14,820	23,640	1	1		1
	KC TOTAL	79,813	945	3220 (7)	2260	10,618	0	792	97,648 ✓	199,140 ✓	5	3	2	4
	OMTM/PBQD	80,800	1677	3220 (7)	2260	10,800	600	0	99,357	198,714	5	3	2	4
	Δ	<987>	<732>	—	—	<182>	<600>	792	<1709>	426	—	—	—	—

SCRTD / METRO RAIL
TUNNEL ESTIMATE CHECK – $

3/4/83
[illegible] / GHM

REACH →	2	5	6	8	10	12	14		TOTALS	
ESTIMATED COST ($M)	$40.4M	$64.1M	$47.8M	$51.6M	$71.2M	$65M	42.9		$383M	
L - TWIN BORE (LF)	7,500LF	12,100LF	10,400LF	7,600LF	17,000LF	16,500LF	9,700 LF		80,800LF	
UNIT COST ($/LF)	$5,400/LF	$5,300/LF	$4,600/LF	$6,800/LF	$4,200/LF	$4,000/LF	$4,400/LF		$4,700/LF	
EQUIPMENT	7,000,000	$6,600,000	7,000,000	7,200,000	7,000,000	11,000,000	7,000,000		52,800,000	
UNIT COST	$933/LF	$545/LF	$673/LF	$947/LF	$412/LF	$667/LF	$722/LF		$653/LF	
LABOR	$13,176,000	15,768,000	13,176,000	15,120,000	20,952,000	19,224,000	11,448,000		108,864,000	
UNIT	$1757/LF	$1303/LF	$1266/LF	$1989/LF	$1232/LF	$1165/LF	$1180/LF		$1347/LF	
GENERAL EXPENSE	$2,994,500	4,134,000	2,994,500	3,869,000	4,213,500	4,001,500	3,047,500		25,254,500	
UNIT	$399/LF	$342/LF	$288/LF	$509/LF	$248/LF	$243/LF	$314/LF		$313/LF	
MATERIALS	$7,550,000	10,675,000	13,000,000	9,400,000	21,000,000	13,695,000	10,925,000		86,245,000	
UNIT	$1007/LF	$882/LF	$1250/LF	$1237/LF	$1236/LF	$830/LF	$1126/LF		$1067/LF	
CONSUMABLES	244,000	292,000	244,000	280,000	388,000	356,000	212,000		2,016,000	
UNIT	$33/LF	$24/LF	$23/LF	$37/LF	$23/LF	$22/LF	$22/LF		$25/LF	
MUCK DISPOSAL	$1,518,966	2,450,600	2,106,300	1,539,220	3,442,991	3,313,580	1,801,630		16,173,287	
UNIT	$203/LF	$203/LF	$203/LF	$203/LF	$203/LF	$201/LF	$186/LF		$200/LF	
GROUND WATER LOWERING	$500,000	—	—	—	—	—	—		500,000	
UNIT	$67/LF								$67/LF	*
CROSS PASSAGES	$1,400,000	2,200,000	2,000,000	1,200,000	3,200,000	3,200,000	1,900,000		15,100,000	
UNIT	$187/LF	$182/LF	$192/LF	$157/LF	$188/LF	$194/LF	$196/LF		$187/LF	
FINISH TUNNEL	$750,000	1,210,000	1,040,000	760,000	1,700,000	1,650,000	970,000		8,080,000	
UNIT	$100/LF	$100/LF	$100/LF	$100/LF	$100/LF	$100/LF	$100/LF		$100/LF	
STEEL LINER	—	12,444,100	—	5,486,880	—	—	—		17,930,980	
UNIT		$1028/LF		$722/LF					$910/LF	*
SHIELD PIT (LEFT OUT OF [illegible])						391,000			391,000	
UNIT						$24/LF			$24/LF	*
SUBTOTAL	35,133,466	55,773,700	41,560,800	44,855,100	61,896,491	~~[illegible]~~ 55,231,080	37,304,130		~~332,963,767~~	333,334,767
O.H. & PROFIT %	15%	15%	15%	15%	15%	15	15		15%	
O.H. & PROFIT $	5,270,020	8,366,055	6,234,120	6,728,265	9,284,474	~~[illegible]~~ 8,284,662	5,595,620		~~44,444,508~~	50,003,214
UNIT	$703/LF	$691/LF	$600/LF	$885/LF	$546/LF	~~$[illegible]~~/LF	$577/LF		~~$[illegible]/LF~~	$611/LF
TOTAL	40,403,486	64,139,755	47,794,920	51,583,365	71,180,965	~~[illegible]~~ 63,515,742	42,899,750		382,908,233	383,357,783
$ UNITS =	$5382/LF	$5,300/LF	$4,597	$6,787/LF	$4187/LF	~~$3934~~ 3961/LF	$4423/LF		~~$4739/LF~~	$4745/LF

* UNIT COSTS BASED ON ACTUAL LINEAL FEET

SCRTD / METRO RAIL — 3/11/83 — 1 OF 3 SHEETS

TUNNEL ESTIMATE CHECK — AWJ/GHM

	REACH →	2	5	6	8	10	12	14	TOTALS
	TWIN BORE LENGTH (LF)	7500							
	UNIT COST / LF	5400							
	EST. COST (M)	$40.5							
1.	DEPOSIT MATL: (LF)								
	WATER LOGGED SAND	1300						1500	
	PUENTE / FERNANDO	4000	12,100	10,400		17,000	14,500	3,200	
	DRY SAND	2200			7,400				
	TOTAL	7500	12,100	10,400	7,400			9,700	
	TIME ALLOTMENT (wks)								
	EXCAVATION	48	61	52	41	85	83		
	ASSEMBLE / LAUNCH	4	4	4	4	4	4		
	MODIFY TBM	1			3	6			
	SKID TUNN STR.	6	6	3			1		
	ON MAINT / REMOVE	2	2	2	2	2	2		
	TOTAL	61	73	61	70	97	89	53	
	RATE OF ADVANCE (FT/DAY)								
	ALLUVIAL DEPOSITS	25							
	SEDIMENTARY:	40	40	40		40	40	40	
	OIL + GAS BEARING				25				
	BELOW WATER TABLE							25	
2.	EQUIPMENT								
	No. TBM's	2	2	2	2	2	2	2	
	COST / EA	$2.5M	$2.2M	$2.5M	$2.5M	$2.5M	$4.5M	$2.5M	
	OTHER PLANT EQUIP	$2M	$2.2M	$2.0M	$2.2	$2.0M	$2.0M	$2.0M	
	TOTAL	$7.0M	$6.6M	$7.0M	$7.2M	$7.0M	$11.0M	$7.0M	$62.8M
3.	LABOR								
	TOTAL M.M.	61	73	61	70	97	89	53	
	UNIT COST	$216K	$216K	$216K	$216K	$216K	$216K	$216K	
	COST	$13.176M	$15.768M	$13.176M	$15.12M	$20.952M	$19.224M	$11.448M	$108.864M
4	GEN EXPENSE								
	TOTAL M.M.	113	156	113	146	159	151	115	
	UNIT COST	$26.5K	$26.5K	$26.5K	$26.5K	$26.5K	$26.5K	$26.5K	
	COST	$2.9945M	$4.134M	$2.9945M	$3.869M	$4.2135M	$4.0015M	$3.045M	$25.2515M
	SUBTOTAL	$23.1705	$26.502	$23.1705	$26.189	$32.1655	$34.2255	$21.4955	$186.9185M

SCRTD / METRO RAIL
TUNNEL ESTIMATE CHECK

3/11/83
AWJ/GHM

	REACH →	2	5	6	8	10	12	14	TOTAL
5.	MATERIALS								
	# OF RINGS W/ GASKET	300	—	6,500	4,700	10,500	—	1,000	
	# OF RINGS W/OUT GASKET	3,400	41,100	—	—	—	8,300	5,100	
	UNIT COST W/ GASKET	$2,000	—	$2,000	$2,000	$2,000	—	$2,000	
	UNIT COST W/OUT GASKET	$1,750	1,750	—	—	—	$1,650	$1,750	
	TOTAL COST	$7.55M	$10.675M	$13.0M	$9.4M	$21.0M	$13.695M	$10.925M	86.245M
6.	CONSUMABLES								
	TOTAL W W	61	73	61	70	97	89	53	
	UNIT COST	$4 K	$4 K	$4K	$4K	$4K	$4K	$4 K	
	COST	$244 K	$292 K	$244K	$280 K	$388 K	$356 K	$212 K	2.016M
7.	MUCK DISPOSAL								
	CY	253,141	409,438	351,050	256,536	573,832	552,263	300,272	
	UNIT COST ($/cy)	$6.0	$6.0	$6.0	$6.0	$6.0	$6.0	$6.0	
	TOTAL	$1,519,946	$2,460,000	$2,106,300	$1,539,220	$3,442,991	$3,313,580	$1,801,630	16.173287M
8.	DEWATERING L.S.	500K	—	—	—	—	—	—	0.5M
9	CROSS PASSAGES								
	SPACING	500'	500'	500'	500'	500'	500'	500'	
	#	14	22	20	12	32	32	19	
	UNIT COST	$100K	$100K	$100K	$100K	$100K	$100K	$100K	
	TOTAL	$1.4M	$2.2M	$2.0M	$1.2M	$3.2M	$3.2M	$1.9M	15.1M
10.	FINISH								
	LF	7,500	12,100	10,400	7,600	17,000	16,500	9,700	
	UNIT COST ($/LF)	$100	$100	$100	$100	$100	$100	$100	
	TOTAL	$750K	$1.21M	$1.04M	$760K	$1.7M	$1.65M	$970K	8.08M
	SHIELD PIT						$51.4K		$9.14M
11	STEEL LINER								
	LF	—	12,100	—	5,880	—	—	—	
	UNIT COST (MTL)	—	$721	—	$721	—	—	—	
	TOTAL	—	$8,724,100	—	$3,800,880	—	—	—	
	LABOR (WW)	—	31	—	14	—	—	—	
	UNIT COST	—	$120,000	—	$120K	—	—	—	
	TOTAL	—	$3,720,000	—	$1,680,000	—	—	—	
	TOTAL	—	$12,444,100	—	$5,486,880	—	—	—	17.930980M

PAGE SUBTOTAL: $46,496,647

SCRTD ESTIMATE CHECK
STATIONS - COMPARATIVE CHECK (SHELL) 3/9/83 AWT/KET/GHM

FOOTNOTES: * FIGURE NOT INCLUDED IN DMJM/PBQD ESTIMATE
** ARITHMETIC MISTAKE IN DMJM/PBQD ESTIMATE
++ DMJM ROUNDED OFF FIGURE TO $14,890,000

	ITEM	1 UNION STA	2 1ST & HILL	3 5TH & HILL	4 7TH & FIGUEROA	5 Wilshire & Alvarado	6 Wilshire & VERMONT	7 Wilshire & NORMANDIE	8 Wilshire & Western	9 Wilshire & LA BREA	10 Wilshire & FAIRFAX	11 FAIRFAX & BEVERLY	12 FAIRFAX & SANTA MONICA	13 SUNSET & LA BREA	1 Hollywood & Cahuenga	2 Universal City	3 N. Hollywood	4 TOTALS	5 SUBTOTAL FOR CONCRETE	6 % OF TOTAL COST	7 % OF CONCRETE SUBTOTAL
	LEVEL	ONE	O/U	O/U	ONE	ONE	ONE	ONE	ONE	ONE	TWO	ONE	ONE	—	—	—	ONE	—			
	TYPE	"B"	"E"	"E"	"A"	"B"	"C"	"C"	"C"	"C"	"E"	"B"	"C"	—	—	—	C	—			
	℄	640'	631'	631'	740'		567'	672'	660'	660'	935'	685'	680'	690'	635'	630'	672'				
	W	66'-8"	62'-9"	62'-9"	62'-7"		66'-8	64'-8"	64'-8"	65'	65'-1"	62'-8"	65'	65'-1"	65'	65'	64'-8"				
	T	29'	—	—	—		VARIES	12'-4"	16'-4	15'-6"	66'-8"	27'-3"	16'-3"	16'-3"	16'-3"	16'-2"	12'-4"				
	D	34.5'	66'-10"	86'-6"	53' (±)		45'-10"	63'-7"	54'-6"	52.5'	84'	42'	45'	55'	65'	55'	63'-7"				
1)	DEMOLITION	300,000	50,650	40,650	109,850	70,200	39,000	39,700	150,000	103,750	131,200	64,250	30,000	85,000	120,000	500,000	39,700	1,924,150		0.8	
2)	EARTHWORK	2,764,150	6,983,750	9,347,550	7,694,050	3,096,600	3,186,700	5,711,900	5,174,400	5,096,750	11,830,150	3,901,200	4,295,050	5,093,800	4,231,600	3,834,100	5,711,400	89,952,050		36.1	
3)	CONCRETE																				
	A) FORMWORK	1,600,950	2,568,200	3,156,950	1,495,700	590,150	940,600	1,486,350	1,758,700	1,627,750	2,922,850	1,087,000	1,675,300	1,630,700	1,509,250	1,448,100	1,643,150		27,141,700		28.9
	B) CONCRETE	2,023,400	2,434,600	3,081,800	1,818,150	1,083,700	1,450,700	1,654,400	1,814,500	1,744,900	3,439,250	1,139,050	1,643,550	1,760,100	1,573,950	1,555,300	1,654,340		29,827,690		31.7
	C) REBAR	2,218,600	2,738,750	3,490,300	1,964,100	1,213,300	1,575,000	1,794,000	1,825,000	1,968,300	3,669,300	1,226,350	1,784,400	1,905,500	1,703,250	1,693,400	2,120,400		34,879,350		35.0
	D) CURING	14,200	19,800	31,450	14,050	7,500	11,000	18,550	13,800	19,150	22,750	10,900	17,850	19,500	17,900	7,700	18,550		259,750		0.2
	E) FINISHING	279,400	309,850	413,650	95,450	58,450	102,900	299,550	186,500	309,000	480,350	246,150	214,700	349,950	292,300	43,300	299,550		3,945,450		4.2
	TOTAL CONC =	6,142,550	8,070,600	10,174,150	5,387,450	2,952,700	4,066,200	5,249,850	5,449,000	5,727,700	10,534,500	3,709,450	5,333,800	5,635,750	5,097,650	4,737,800	5,735,990	94,045,140	94,045,140	38.5	100.0%
4)	WATERPROOFING	85,100	312,000	279,650	186,300	70,050	126,600	177,300	140,900	172,600	188,000	116,600	177,450	183,600	166,300	165,100	177,300	2,725,050		1.1	
5)	SITE RESTORATION	1,045,000	128,250	176,500	254,000	100,000	169,350	162,000	184,300	140,000	128,000	121,400	180,000	179,000	101,300	12,448,500	161,930	16,369,520		6.7	
6)	TRAFFIC MAINT	15,000	41,650	49,000	53,600	11,000	15,000	15,400	17,000	15,600	21,700	16,100	16,600	19,100	17,000	30,000	15,400	371,150		0.2	
7)	UTILITIES SUPPORT	517,600	773,850	1,003,650	684,050	73,800	379,600	567,800	558,300	562,850	1,184,300	239,500	501,800*	564,900	286,400	103,000	567,900	8,571,800		3.5	
8)	MOBILIZATION	434,800	649,150	862,950	547,400	253,000	318,900	476,950	446,600	472,800	983,850	328,900	421,500*	474,500	469,700	415,900	476,950	7,945,850		3.2	
												4,108,000 (PARKING)						1,108,000		1.7	
	SUB TOTAL DIRECT COST	11,304,200	16,979,300	21,819,500	14,917,300	6,629,150	8,290,350	12,400,400	12,170,500	12,292,050	25,603,700**	12,673,100	10,958,400	12,235,050**	10,535,950**	22,954,400	12,886,460	229,012,710		91.6	
	G.C. OVERHEAD %	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%				
	$	1,130,400	1,698,000	2,182,950	1,491,700	662,850	829,050	1,240,000	1,217,000	1,229,000	2,560,370	1,267,600	1,095,840	1,223,505	1,053,595	2,295,000	1,288,640	22,905,500		9.2	
	BOND %	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%				
	$	124,302	186,809	240,200	164,100	73,000	91,200	136,400	134,000	135,000	281,641	139,400	120,542	134,586	115,895	252,450	141,750	2,464,314		1.0	
	PROFIT %	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%				
	$	502,400	754,600	1,972,350	662,900	295,000	368,400	551,200	540,500	546,050	1,137,828	563,300	486,991	543,726	468,118	989,000	572,650	9,955,113		4.0	
	SUB TOTAL	13,061,300	19,619,300	25,280,500	17,236,000	7,660,000	9,577,000	14,328,000	14,062,000	14,202,100	29,583,539	14,645,700	12,661,773	14,136,867	12,173,458	25,713,400	14,889,500	264,337,637		105.8	
	DEPTH ELEVATION	—	(3,680,000)	(3,220,000)	—	(2,740,000)	(920,000)	(3,680,000)	—	—	—	—	—	—	—	—	—	(14,260,000)		(5.8)	
	TOTAL	13,061,300	15,939,300	22,060,500	17,236,000	4,920,000	8,657,000	10,648,000	14,062,000	14,202,100	29,583,539	14,645,700	12,661,773	14,136,867	12,173,458	25,713,400	14,889,500	250,077,637			

-86A-

KC 1223 SCRTD/METRO RAIL — 3/17/03
ESTIMATE CHECK - STATIONS
UNIT PRICES

	STATIONS →	UNITS	UNION STATION	1ST + HILL	5TH + HILL	7TH + FLOWER	ALVARADO + WILSHIRE	VERMONT + WILSHIRE	NORMANDIE + WILSHIRE	WESTERN + WILSHIRE	LEBREA + WILSHIRE	FAIRFAX + WILSHIRE	BEVERLY + FAIRFAX	SANTA MONICA	LEBREA + SUNSET	HOLLYWOOD + CAHUENGA	UNIVERSAL CITY	LANKERSHIM
1	1. DEMOLITION																	
2	REMOVE RR. TRACES	LF	15															
3	REMOVE RR CANOPIES	LF	200															
4	DEMOLISH CONC. BLDG.	CF	0.20															
5	A=C PAVING	SF	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
6	MISCELLANEOUS	LS	18,850				2,400							2,150	19,800	22,650	41,200	
7	HALLAWAY	CY	6	6.80	6.80	6.80	6.80	6.80	6	5.57	6	6	6	6	6	6	6	6
8	CONCRETE PAVING (SLABS)	SF		1.50	1.50	1.50		1.50	1.50	1.50	0.30				1.50	1.30		1.50
9	CONCRETE STAIRS	SF		2.80														
10	TRAFFIC LIGHTS	EA		500	500	500			500	500	500			500				500
11	STREET LIGHTS	EA		500	500	500		500	500	500	500			500				500
12	MANHOLES	EA		250	250	250		250	250	250	250							250
13	SIGNS	EA		50	50	50		50	50	50	50							50
14	PARKING METERS	EA		85	85	85		85	85	85	85							85
15	FIRE HYDRANTS	EA		250	250	250		250	250	250	250			250				250
16	LIGHT STANDARDS	EA		500	500	500												
17	PLANTERS	EA		100	100													
18	CONCRETE CURBING	L.F		1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
19	BUILDING BRICK (2 STORY)	CF					0.15											
20	MASONRY BLDG.	CF								0.20	0.20					0.20		
21	CANOPY	SF								10								
22	REMOVE BLDG. FRONT	CF										0.50						
23	CONCRETE SIDEWALKS	SF										0.50						
24	CLEAR + GRUB	SF										0.25	0.06					
25	BLDG DEMOLITION	CF										0.15			0.15		0.15	
26	2'-3' MASONRY WALLS	LF											4					
27	8' CL. FENCING	LF											1					
28	POLE LIGHTS	EA											300					
29	SERVICE STATION	L.S.												10,000				
30																		
31	2. EARTHWORK																	
32	EXCAVATION MACHINE	CY	4	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
33	EXCAVATION HAND	CY	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
34	COMPACTED BACKFILL	CY	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75		15.75	15.75	15.75	15.75
35	EXCESS SOIL DISPOSAL	CY	6	5.57	5.57	5.57	5.57	5.57	5.57	5	6	6	6	5.57	6	5.57	6	5.57
36	SOLDIER PILE + LAGGING	SF	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
37	DECKING WALKWAYS/ENTRIES	SF	6	6	6	6			6	6	6	6	6	6	6		6	6
38	DEWATERING	Mo.	2,650	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650
39	SOLDIER STAIRWELL/SHALLOW	SF		24	24	24				24	24				24			24
40	DECKING, ROADWAY	SF		13.72	13.72	13.72	13.72	13.72	13.72	13.72	13.72	13.72	13.72	13.72	13.72	13.72		13.72
41	UNDERPINNING CONC.	CY		800		800				800						800		

KC 1223 SCRTD/METRO RAIL 3/17/23
ESTIMATE CHECK - STATIONS
UNIT PRICES 2 OF 3

	STATIONS →	UNITS	UNION STATION	1st + HILL	5th + HILL	7th & FLOWER	ALVARADO & WILSHIRE	VERMONT & WILSHIRE	NORMANDIE & WILSHIRE	WESTERN & WILSHIRE	LEBREA & WILSHIRE	FAIRFAX & WILSHIRE	BEVERLY & FAIRFAX	SANTA MONICA	LEBREA & SUNSET	HOLLYWOOD & CAHUENGA	UNIVERSAL CITY	LANKERSHIM	
1	2. EARTHWORK (Cont'd)																		
2	UNDERPINING - JACKED	LF	—	—	50-	—	—	—	—	—	—	—	—	—	—	—	—	—	
3																			
4	3. CONCRETE WORK																		
5	A. FORMWORK (1 USE)																		
6	WALLS to 8'0"	SF	4.98	4.98	4.98	4.98	4.98	4.98	4.98	4.98	4.98	4.98	4.98	4.98	4.98	4.98	4.98	4.98	
7	WALLS to 8'0"-16'0"	SF	6.27	6.27	6.27	—	—	—	6.27	6.27	6.27	6.27	—	6.27	6.27	—	—	6.27	
8	WALLS >16'0"	SF	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	
9	ELEV SLAB WALLS/MEZZ	SF	6.60	6.60	6.60	6.60	—	—	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	
10	ELEV SLAB-LIGHT	SF	3.90	3.90	3.90	3.90	3.90	3.90	—	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	—	
11	ELEV SLAB - HEAVY	SF	5.05	5.-	5.-	—	—	—	—	—	5.05	5.-	5.-	—	5.-	5.-	5.-	—	
12	ELEV SLAB-EDGE	SF	3.-	3.-	3.-	3.-	3.-	3.-	3.-	3.-	3.-	3.-	3.-	3.-	3.90	3.-	3.-	3.-	
13	GRADE SLAB/DRAIN SLOTS	SF	3.-	3.-	3.-	3.-*	3.-	3.-	3.-	3.-	3.-	3.-	3.-	3.-	3.-	3.-	3.-	3.-	*7th & Flower Grade Slab EST not extended.
14	COLUMNS/PILLARS	SF	5.50	5.50	5.50	5.50	5.50	—	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	
15	BEAMS - SIDES	SF	5.50	5.50	5.50	5.50	—	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	
16	BEAMS - BOTTOMS	SF	7.25	7.25	7.25	7.25	—	—	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	
17	BLAST SHAFT WALLS	SF	7.39	—	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	
18	ROOF + MEZZ	SF	—	5.05	5.05	5.05	—	5.05	—	5.05	—	5.05	—	5.50	—	—	—	—	
19	ELEV SLABS	SF	—	—	—	—	—	—	4.45	—	—	—	—	—	—	—	—	4.45	
20	INTERIOR ANCILLARY WALLS	SF	—	—	—	—	—	—	—	7.39	—	—	—	—	—	—	—	—	
21																			
22	B. CONCRETE-IN-PLACE																		
23	WALLS ≦ 15" THICK	CY	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	
24	WALLS > 15" THICK	CY	21.-	21.-	21.-	21.-	21.-	21.-*	21.-	21.-	21.-	21.-	21.-	21.-	21.-	21.-	21.-	21.-	*Vermont/Wilshire, Walls > 15' Thick EST. indicated
25	ELEVATED SLABS	CY	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10	
26	GRADE SLABS	CY	13.55	13.55	13.55	13.55	13.55	13.55	13.55	13.55	13.55	13.55	13.55	13.55	13.55	13.55	13.55	13.55	
27	COLUMNS/PILLARS	CY	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	
28	BEAMS	CY	37.-	—	—	—	—	44.-	37.-	37.-	37.-	37.-	37.-	37.-	37.-	37.-	37.-	37.-	
29	BLAST SHAFT WALLS	CY	23.50	—	—	—	21.-	—	21.-	21.-	21.-	21.-	21.-	—	21.-	21.-	21.-	21.-	
30	4000 PSI CONCRETE	CY	52.-	52.-	52.-	52.-	52.-	52.-	52.-	52.-	52.-	52.-	52.-	52.-	52.-	52.-	52.-	52.-	
31	BEAMS-LARGE	CY	—	30.-	30.-	44.-	—	—	—	—	—	—	—	—	—	—	—	—	
32	- SMALL	CY	—	44.-	44.-	30.-	—	—	—	—	—	—	—	—	—	—	—	—	
33	ELEV SLAB WALL	CY	—	—	—	—	—	—	23.50	—	21.-	23.50	—	23.50	—	—	—	23.50	
34																			
35	C. REBAR	LB	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	400-*	*Lankershim Rebar calculated in tons.
36																			
37	D. CURING	SF	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
38																			
39																			
40																			

KC 1223 SCRTD/METRO RAIL — 3/17/83
ESTIMATE CHECK - STATIONS — 3 OF 3
UNIT PRICES

	STATIONS	UNITS	UNION STATION	1st + HILL	5th + HILL	7th + FLOWER	ALVARADO + WILSHIRE	VERMONT + WILSHIRE	NORMANDIE + WILSHIRE	WESTERN + WILSHIRE	LEBREA + WILSHIRE	FAIRFAX + WILSHIRE	BEVERLY + FAIRFAX	SANTA MONICA	LEBREA + SUNSET	HOLLYWOOD + CAHUENGA	UNIVERSAL CITY	LANKERSHIM
3	CONCRETE WORK (Contd)																	
	F FINISHING																	
	TROWEL	SF	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.28	0.34
	FLOAT	SF	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
	PATCH/RUB	SF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.59	0.81	0.81	0.59	0.81
	SANDBLAST	SF	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.81	0.59	0.59	0.81	0.59
4	WATERPROOFING																	
	5/16" BENTONITE	SF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.88	0.86	0.86	0.86
	WATERSTOP	LF	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
	JOINT PACKING	LF	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60
5	SITE RESTORATION																	
	AC PAVING	SF	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
	CONCRETE PAVING	SF	2.50	—	—	—	—	—	2+	—	2-	3+	—	—	2-	2-	2-	2-
	RR. CANOPY	SF	25-	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	RR. TRACK & BALLAST	LF	100-	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	SEAL BLDG. WALL	SF	20-	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	LANDSCAPING	SF	2-	—	—	—	—	—	—	—	—	1.50	—	—	—	—	—	—
	CONCRETE SIDEWALKS	SF	—	1.87	1.87	1.87	1.87	1.87	—	1.87	—	2-	—	—	—	—	—	—
	CONCRETE CURBING	LF	—	9.40	9.40	9.40	9.40	9.40	9.40	9.40	9.40	9.40	9.40	9.40	9.40	9.40	9.40	9.40
	SIGNS-REINSTALL	EA	—	100-	100-	100-	—	100-	100-	100-	100-	—	—	—	—	—	—	100-
	TRAFFIC SIGNALS "	EA	—	600-	600-	600-	—	—	600-	600-	600-	—	—	600-	—	—	—	600-
	STREET LIGHTS "	EA	—	600-	600-	600-	—	600-	600-	600-	600-	—	—	600-	—	—	—	600-
	PARKING METERS "	EA	—	100-	100-	100-	—	100-	100-	100-	100-	—	—	—	—	—	—	100-
	MAN HOLES	EA	—	—	1500-	1500-	—	1500-	1500-	1500-	1500-	—	—	—	—	—	—	1500-
	FIRE HYDRANTS	EA	—	—	1000-	1000-	—	1000-	1000-	1000-	1000-	—	—	1000-	—	—	—	1000
	LIGHT STANDARDS	EA	—	—	600-	600-	—	—	—	—	—	—	—	—	—	—	—	—
	MISC.	%	LS	LS	LS	5-	LS	—	—	—	LS	LS	LS	LS	LS	LS	—	—
	PARKING LOT STRIPING	SF	—	—	—	—	—	—	—	—	—	0.50	0.02	—	—	—	0.02	—
	PARKING LOT LIGHTING	EA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3000-	—
	PARKING LOT BUMPERS	EA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25-	—
	PARKING STRUCTURE	CAR	—	—	—	—	—	—	—	—	—	—	4320-	—	—	—	6300-	—
6	TRAFFIC MAINTENANCE																	
	6' C.L. FENCING	LF	6-	5.75	5.75	5.75	5.75	6	5.75	6	6	6	6	6	6	6	6	6
	MISC.	%	LS	LS	LS	.5	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS
7	UTILITIES SUPPORT	%	5	5	5	5	1,230*	5	5	5	5	5	3	5	5	2.5	1	5
8	MOBILIZATION	%	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

*ALVARADO WILSHIRE CALCULATED IN LF (UNIT)

KC 1223 - SCRTD/METRO RAIL
ESTIMATE CHECK - STATIONS
QUANTITIES

3/22/83
2 OF 3

STATIONS	UNITS	UNION STATION	1st & HILL	5th & HILL	7th & FLOWER	ALVARADO & WILSHIRE	VERMONT & WILSHIRE	NORMANDIE & WILSHIRE	WESTERN & WILSHIRE	LEBREA & WILSHIRE	FAIRFAX & WILSHIRE	BEVERLY & FAIRFAX	SANTA MONICA	LEBREA & SUNSET	HOLLYWOOD & CAHUENGA	UNIVERSAL CITY	LANKERSHIM	TOTAL
2. EARTHWORK (Cont'd)																		
Underpinning - Jacked	LF	—	—	6295	—	—	—	—	—	—	—	—	—	—	—	—	—	6295
3. CONCRETE WORK																		
A. FORMWORK (1 use)																		
Walls to 8'0"	SF	11550	51322	55144	14553	15197	14874	14550	14550	14550	29100	14700	14550	14550	14650	14550	14550	325840
Walls 8'0" to 16'0"	SF	12400	62861	70288	—	—	—	13440	9940	8650	10560	—	15008	8710	—	—	13440	220297
Walls > 16'0"	SF	98600	80964	83390	57138	18483	48350	58640	52680	58250	81160	33885	53582	50370	46355	41147	58640	722980
Elev. Slab Walls/Mezz.	SF	1585	11862	11862	7299	—	—	3885	4050	3150	22400	1150	3833	1900	1200	600	3885	77901
Elev. Slab - Light	SF	14400	40384	43372	34020	15040	14720	—	21060	32922	14400	14400	30276	32340	33804	31600	—	317258
Elev. Slab - Heavy	SF	54950	34170	37121	—	25694	—	—	—	30932	58430	26670	—	32340	29760	29586	—	359573
Elev. Slab - Edge	SF	900	2848	3036	900	940	920	900	900	900	900	1370	900	900	1270	900	900	19348
Grade Slab/Drain Slots	SF	720	1262	1356	740	470	567	672	660	660	935	685	680	670	635	630	672	18084
Columns/Pillars	SF	20450	29500	33790	16417	16046	—	63773	40220	62034	90392	12330	64332	73693	67765	67202	63773	674355
Beams-Sides	SF	16495	72884	95631	39928	—	19600	34420	18304	41812	94215	54347	41275	39885	40658	38183	34420	677347
Beams-Bottoms	SF	10400	18557	23631	13696	—	3204	14690	12452	14671	22342	13112	14937	14650	14305	13947	14690	219186
Blast Shaft Walls	SF	13600	—	81435	9440	13860	17508	13600	35100	13600	75500	13600	13600	13600	13600	14300	13600	306143
Roof & Mezz.	SF	—	40887	51888	68521	—	37800	—	35125	—	24000	—	31870	—	—	—	—	289191
Elev. Slab	SF	—	—	—	—	—	—	61250	—	—	—	—	—	—	—	—	61250	122500
Interior Ancillary Walls	SF	—	—	—	—	—	—	—	36800	—	—	—	—	—	—	—	—	36800
B. CONCRETE-IN-PLACE																		
Walls ≤ 15" Thick	CY	275	2191	2816	400	575	267	544	1086	1424	943	272	544	578	596	590	544	15145
Walls > 15" Thick	CY	7647	12937	15699	9087	1048	2820	3387	3772	3947	18090	4402	4038	4366	3219	3496	3387	103048
Elevated Slabs	CY	6746	8375	9541	5402	6310	4840	4662	4781	5124	10080	1622	4708	5019	4538	4434	173	86349
Grade Slabs	CY	10453	7890	12868	8920	6029	10475	8624	8783	9140	10679	7074	8727	8865	8150	8085	8624	142776
Columns/Pillars	CY	552	818	957	588	692	1330	3708	2043	3241	11442	350	3752	3807	3503	3476	3708	38867
Beams	CY	704	—	—	—	—	1111	1846	2024	1813	3216	1448	1624	1832	1796	1752	1846	21292
Blast Shaft Walls	CY	615	—	—	—	1310	—	615	1842	615	3565	968	—	615	615	615	615	11990
4000 PSI Conc.	CY	29192	34311	43582	25843	15964	20723	23559	24331	25819	48280	16136	23479	25072	22411	22150	23559	424414
Beams - Large	CY	—	1047	1494	1041	—	—	—	—	—	—	—	—	—	—	—	—	3582
Beams - Small	CY	—	1053	1307	605	—	—	—	—	—	—	—	—	—	—	—	—	2965
Elev. Slab Wall	CY	—	—	—	—	—	—	173	—	85	565	—	86	—	—	—	—	909
C. REBAR	LB	5838400	7205600	9184950	5168600	3192800	4144600	4711800	4902600	5163800	9656000	3227200	4695800	6014400	4482200	4430000	4712000	86630750
D. CURING	SF	284190	395400	628364	280800	149225	219350	370900	277432	382447	455000	218078	350800	389410	257130	253900	370900	5189326

KC 1223 SCRTD/METRO RAIL — 3/22/83
ESTIMATE CHECK - STATIONS — 3 OF 3
QUANTITIES

	STATIONS →		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
		UNITS	UNION STATION	1st & HILL	5th & HILL	7th & FLOWER	ALVARADO & WILSHIRE	VERMONT & WILSHIRE	NORMANDIE & WILSHIRE	WESTERN & WILSHIRE	LEBREA & WILSHIRE	FAIRFAX & WILSHIRE	BEVERLY & FAIRFAX	SANTA MONICA	LEBREA & SUNSET	HOLLYWOOD & CAHUENGA	UNIVERSAL CITY	LANKERSHIM		TOTAL	
3.	CONCRETE WORK (Cont'd)																						
	E. FINISHING																						
	Trowel	SF	139950	63000	117689	32650	23200	43660	47500	53834	49220	30730	33800	9800	49837	48917	47380	47500		933667		
	Float	SF	38610	39600	57667	46400	30400	37800	55650	42683	57200	120250	42950	3950	59800	55033	54600	55650		853243		
	Patch/Rub	SF	152600	313400	407356	64800	8500	11868	185700	128630	207200	298647	161541	7100	211187	186900	8070	183700		2547172		
	Sandblast	SF	152600	39930	45652	31150	41700	114221	200750	87451	190620	298647	154794	23960	194137	183442	8070	200750		2153474		
4.	WATERPROOFING																						
	5/16" Bentonite	SF	49580	264422	159250	148380	47000	99374	111721	109900	109833	120700	85800	2980	114553	105900	105113	111721		1856107		
	Waterstop	LF	2880	8328	15910	3700	2140	2635	3206	2900	2900	6000	2990	3980	5019	2800	2780	3206		68274		
	Joint Packing	LF	4250	5440	7018	6800	2800	4390	10775	4850	10682	8095	4172	2903	11063	10182	10161	10775		121576		
5.	SITE RESTORATION																						
	AC Paving	SF	28500	44810	56550	49800	33150	71300	58600	51260	53330	198800	89200	3150	69000	41300	252000	58600		1241750		
	Conc. Paving	SF	13500	—	—	—	—	—	260	2000	250	2200	—	—	18700	7700	100000	260		144870		
	RR Canopy	SF	18400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		18400		
	RR Track & Ballast	LF	3590	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		3590		
	Seal Bldg. Wall	SF	1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		1800		
	Landscaping	SF	5000	—	—	—	—	—	—	—	—	102700	—	—	—	—	LS	—		107700		
	Conc. Sidewalks	SF	—	13025	4825	40960	7975	20250	—	—	—	61000	—	—	—	—	—	—		129335		
	Conc. Curbing	LF	—	1010	1855	1590	360	2450	1840	1540	1460	6150	2170	250	1560	650	7400	1840		32125		
	Signs - Reinstall	EA	—	3	4	8	—	5	15	5	7	—	—	—	—	—	—	15		62		
	Traffic Signals "	EA	—	4	8	16	—	—	10	8	4	—	—	2	—	—	LS	10		62		
	Street Lights "	EA	—	11	14	40	—	6	18	14	12	—	—	2	—	—	—	18		155		
	Parking Meters "	EA	—	3	10	5	—	24	60	11	15	—	—	—	—	—	—	60		188		
	Manholes	EA	—	—	13	12	—	4	7	36	4	—	—	—	—	—	—	11		83		
	Fire Hydrants	EA	—	—	3	4	—	3	5	6	4	—	—	1	—	—	—	5		31		
	Light Standards	EA	—	—	8	8	—	—	—	—	—	—	—	—	—	—	—	—		16		
	Miscellaneous	%	LS	LS	LS	LS	LS	—	—	—	LS	LS	LS	LS	LS	LS	LS	—		LS		
	Parking Lot Striping	SF	—	—	—	—	—	—	—	—	—	800	1220	—	—	—	9000	—		10020		
	Parking Lot Lighting	EA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	26	—		26		
	Parking Lot Bumpers	EA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	550	—		550		
	Parking Structure	CAR	—	—	—	—	—	—	—	—	—	—	650	—	—	—	1700	—		5850		
6.	TRAFFIC MAINTENANCE																						
	6' C.L. Fencing	LF	1500	1550	1700	1860	1140	2140	1540	1760	1560	2160	1610	660	2250	2040	3700	1540		27910		
	Miscellaneous	%	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	S	LS	LS	LS	LS		LS		
7.	UTILITIES SUPPORT	%	LS	LS	LS	LS	60(LF)	LS	LS	LS	LS	LS	LS	S	LS	LS	LS	LS		60 (LF)		
8.	MOBILIZATION	%	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	S	LS	LS	LS	LS		LS		

APPENDIX B - TUNNELS

	Initials	Date
Prepared by	HRB	3-30-83
Approved by		

SCRTD METRO RAIL PROJECT — TUNNEL DIRECT COST SUMMARY & COMPARISON – ALL (7) REACHES

DESCRIPTION	EST QUANTITY	EST. QUAN. UNIT	EST. U.C.	$ x 1000 KELLOGG EXTENSION	KC U.C./L.F. TWIN BORE TUNNEL	$ x 1000 DMJM/PBQD T.C.	DMJM/PBQD U.C./L.F. TWIN BORE TUNNEL	$ x 1000 DMJM/PBQD KC T.C. Δ	DMJM/PBQD KC U.C. Δ
	⟨80800 DMJM/PBQD								
TUNNEL EXCAV., LINING & GROUT	79810 KC	LF TWIN BORE	—	—	—	—	—	—	
LABOR	526	WORK WEEKS	162000 –	85212	1067.68	108864	1347.33	⟨23652⟩	⟨279.65⟩
PERMANENT MATERIAL	159620	LF TUNNEL	495.60	79106	991.18	86245	1067.39	⟨7139⟩	⟨76.21⟩
EQUIPMENT (RENTAL)	1	L.S.	43987000 –	43987	551.15	52800	653.46	⟨8813⟩	⟨102.31⟩
CONSUMABLES: EQUIP. MAINT. MAT'L	1	L.S.	10912000 –	10912	136.73	—	—	10912	136.73
CONSUMABLES: ELEC., FUEL, LUBES	1	L.S.	10481000 –	10481	131.33	2016	24.95	8465	106.38
CONSUMABLES: TUNNEL UTILITY LINES & TRACK	159620	LF TUNNEL	63.22	10091	126.44	—	—	10091	126.44
CONSUMABLES: SMALL TOOLS & SUPPLIES	3157200	MAN HOURS	1.00	3157	39.55	—	—	3157	39.55
MUCK DISPOSAL	2694000	C.Y.	6.00	16170	202.60	16173.3	200.16	⟨3.3⟩	2.44
CROSS PASSAGES	146	EACH	56250 –	8213	102.91	15100	186.88	⟨6887⟩	⟨83.97⟩
STEEL LINER (REACHES 5 & 8)	17050	LF TWIN BORE	1029.91	17560	220.02*	17931	221.92*	⟨371⟩	⟨1.90⟩
FINISH TUNNEL	159620	LF TUNNEL	115 –	18356	230.00	8080	100.00	10276	130.00
GROUND H₂O PROGRAM (REACH 2)	1	L.S.	500000 –	500	6.26*	500	6.19*	—	0.07
SHIELD PIT (REACH 12)	1	EACH	391000 –	391	4.90*	391***	4.84*	—	0.06
GENERAL EXPENSES	—	—	—	IN O/H	—	25254.5	312.56**	⟨25254.5⟩	⟨312.56⟩
TOTAL DIRECT COST	—	—	—	304136	3810.75	333354.8	4125.68	⟨29218.8⟩	⟨314.93⟩

* NOT MEANINGFULL NO'S SINCE THESE UNIT COSTS REPRESENT AN AVERAGE IMPACT TO ALL TUNNEL FOOTAGE WHEN IN FACT THE COSTS FOR THESE ITEMS ARE INTENDED FOR SPECIFIC REACHES –

** IF THE UNIT COST FOR GENERAL EXPENSES IS REMOVED FROM TOTAL UNIT COST FOR DMJM/PBQD TO MAKE IT MORE CONSISTENT WITH KC'S, UNIT COST VARIANCE IS $⟨2.37⟩/LF OR ⟨.06⟩%.

*** DMJM/PBQD'S EST OF SHIELD PIT COST WAS LEFT OUT OF THEIR COST ROLL UP & SUMMARY

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-22-83

From HEB

Subject SC RTD METRO RAIL TUNNEL GEOLOGY

$A_1(A_3)$ SAND, GRAVEL, SOME COBBLES & BOULDERS IN Z & S; PRIMARILY DENSE, BUT RANGES FROM LOOSE TO VERY DENSE.

$A_2(A_2)$ CLAYS, SILTS, COHESIVE SANDS; PRIMARILY STIFF BUT RANGES FROM FIRM TO HARD.

C FERNANDO & PUENTE FORM., CLAY STONE, SILTSTONE & SANDSTONE; PRIMARILY LOW HARDNESS, WEAK TO MOD. STRONG.

SP SAN PEDRO FORM., PREDOM. CLEAN COHESIONLESS SANDS BUT INCL. LAYERS OF SILT & GRAVELS, MED DENSE TO VERY DENSE, OIL STAIN IN REACH 5

I-5 37% INTRUSIVE BASALT, HARD — MASSIVE MOD. JOINTED; 63% ARM HARD CONGLOMERATE, SANDSTONE, & SILTSTONE, MOD. BLOCKY & SEAMY TO HARD & STRATIFIED

	FROM STA	TO STA.	LF
REACH 2			
	113+12	146+18	3306
	152+49	171+10	1861
	177+41	198+98	2157
			7324 CHK
REACH 5			
	206+38	254+39	4801
	263+89	308+18	4429
	318+45	343+83	2538
			11768 CHK
REACH 6			
	350+55	365+27	1472
	371+87	461+94	9007
			10479 CHK
REACH 8			
	478+64	503+32	2468
	517+27	561+64	4437
	500+00	503+32 STUB	332
			7237 CHK
REACH 10			
	573+09	622+45	4936
	629+25	692+45	6320
	703+95	753+01	4906
			16162 CHK
REACH 12			
	771+86	933+40	16154 CHK
REACH 14			
	939+70	1046+58	10688 CHK
			79812 OK 2 LF ROUNDING ERROR

P2

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-22-83

From HEB

Subject SC RTD METRO RAIL TUNNEL GEOLOGY

FROM STA	TO STA	A1/A2	C	A4	SP	1-5	PERCHED H_2O	PERM. H_2O
110+00	122+50	X A1					X	
122+50	140+00		X				X	X
140+00	171+30		X				X	
171+30	204+20	X A1						
204+20	352+50		X				X	
352+50	394+00			X			X	
394+00	398+50				X		X	
398+50	492+00			X			X	
492+00	517+00				X		X	
517+00	594+00			X			X	
594+00	626+50	X						
626+50	678+00			X				
678+00	687+00	X						
687+00	740+50	X					X	
740+50	760+00	X						
760+00	949+50					X	X	
949+50	965+00	X A1					X	
965+00	1061+50	X A1						

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB S C RTD METRO RAIL DATE 3-22-83

DCE. 6-81-3000 HOECKEL'S 340621

Sheet 1 of 2 Estm HEB Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. LF BY GROUND CONDITION

REACH 2

FROM 113+12 TO 146+18	113+12 TO 122+50, A_1, PERCH H_2O	938 LF, A_1, PERCHED H_2O	3095 @26
	122+50 TO 140+00, C, PERM. H_2O	2157 LF, A_1, NO H_2O	
	140+00 TO 146+18, C, PERCH H_2O	1750 LF, C, PERM. H_2O	4229 @43
FROM 152+49 TO 171+10	152+49 TO 171+10, C, PERCH H_2O	2479 LF, C, PERCHED H_2O	
FROM 177+41 TO 198+98	177+41 TO 198+98, $A_{1,}$ NO H_2O	7324 LF	7324

REACH 5

FROM 206+38 TO 254+39	206+38 TO 254+39, C, PERCH. H_2O	11768 LF, C, PERCHED H_2O	11768 @43
FROM 263+89 TO 308+18	263+89 TO 308+18, C, PERCH. H_2O		
FROM 318+45 TO 343+83	318+45 TO 343+83, C, PERM. H_2O		

REACH 6

FROM 350+55 TO 365+27	350+55 TO 352+50, C, PERCH. H_2O	450 LF, SP, PERCHED H_2O	450 LF @26
	352+50 TO 365+27, A_4, PERCH. H_2O	195 LF, C, PERCHED H_2O	10029 LF @43
FROM 371+87 TO 461+94	371+87 TO 394+00, A_4, PERCH. H_2O	9834 LF, A_4, PERCHED H_2O	
	394+00 TO 398+50, SP, PERCH. H_2O	10479 LF	10479
	398+50 TO 461+94, A_4, PERM H_2O		

-06-

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB SC RTD METRO RAIL DATE 3-22-83

Sheet 2 of 2 Estm HEB Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. LF BY GROUND CONDITION

DCE. 6-81-3000 HOECKEL'S 340621

REACH 8

FROM 478+64 TO 503+22	478+64 TO 492+00, A_4, PERCH. H_2O		
	492+00 TO 503+82, SP, PERCH. H_2O	1464 LF, SP, PERCHED H_2O	1464 @ 26
FROM 517+27 TO 561+64	517+27 TO 561+64, A_4, PERCH. H_2O	5773 LF, A_4, PERCHED H_2O	5773 @ 43
FROM 500+00 TO 503+32	500+00 TO 503+32, SP, PERCH. H_2O	7237 LF	7237

REACH 10

FROM 573+09 TO 622+45	573+09 TO 594+00, A_4, PERCH. H_2O	2091 LF, A_4, PERCHED H_2O	16162 @ 43
	594+00 TO 622+45, A_2, NO H_2O	4875 LF, A_4, NO H_2O	
FROM 629+25 TO 692+45	629+25 TO 678+00, A_4, NO H_2O	4200 LF, A_2, PERCHED H_2O	
	678+00 TO 687+00, A_2, NO H_2O	4996 LF, A_2, NO H_2O	
	687+00 TO 692+45, A_2, PERCH H_2O	16162 LF	
FROM 703+95 TO 753+01	703+95 TO 740+50, A_2, PERCH H_2O		
	740+50 TO 753+01, A_2, NO H_2O		

REACH 12

FROM 771+86 TO 933+40	771+86 TO 933+40, I-5, PERCH. H_2O	16154 LF, I-5, PERCHED H_2O	16154 @ 43

REACH 14

FROM 939+70 TO 1046+58	939+70 TO 949+50, I-5, PERCH. H_2O	8158 LF, A_1, NO H_2O	9708 @ 26
	949+50 TO 965+00, A_1, PERCH. H_2O	1550 LF, A_1, PERCHED H_2O	
	965+00 TO 1046+58, A_1, NO H_2O	980 LF, I-5, PERCHED H_2O	980 @ 43
		10688 LF	10688

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-23-83

From HEB

Subject SC RTD METRO RAIL
TUNNEL PRODUCTION RATE

GENERAL

ADVANCE RATE IN WET OR DRY SAND OF 2.03 LF/HR (UNADJ. AVE.)
ADVANCE RATE IN PUENTE/FERNANDO OF 4.0 LF/HR (UNADJ. AVE.)

A
- ALLOW 45 MIN TO INSTALL 6 PRECAST SEGMENTS (1 RING)
- ALLOW 3 HR/DAY SCHEDULED MAINTENANCE
- ALLOW 1 HR/DAY UNSCHEDULED MAINT., TBM CORRECTION & STANDBY
- ALLOW ½ HR/SHIFT CREW CHANGE
- ALLOW ½ HR/SHIFT LUNCH BREAK
- ALLOW 2 DAYS/MO MAJOR REALIGNMENT, FIX IT, BAD GROUND, H_2O, ABOVE HOURS FOR GAS

B
- ALLOW 6 WKS @ 50% FOR LEARNING CURVE = 3 WKS
- ALLOW 6 WKS FOR MOLE ASSEMBLY & LAUNCH
- ALLOW 3 DAYS FOR TBM MOVES @ ALLUVIAL/SED. INTERFACES
- ALLOW 3 WKS FOR SKIDDING THRU STA & TURNAROUND
- ALLOW 3 WKS FOR TBM DISMANTLE & REMOVAL

A DRY & WET SAND *** (A_1, A_3, SP)

MACHINE AVAILABILITY (HRS/DAY) =

$$24 - 3 - 1 - (3)(\tfrac{1}{2}) - (3)(\tfrac{1}{2}) - (2)(24)/(4.33)(5)$$

$$= 15 \text{ HRS/DAY}$$

PRODUCTION RATE WITH RING INSTALLATION

ADVANCE MOLE @ 20 MIN/LF
INSTALL RING = 45 MIN / 3.25 LF = 14 MIN/LF
TOTAL RATE = 34 MIN/LF
(60 MIN/HR)(1 LF/34 MIN) = 1.75 LF/HR

ADVANCE RATE/DAY = (15 HRS/DY)(1.75 LF/HR) = 26.25 LF/DAY

CALL 26 LF/DAY

A PUENTE/FERNANDO ** (A_2, A_4, C, 1-5)

MACHINE AVAILABILITY = 15 HRS/DAY
PROD. RATE WITH RING INSTALLATION
ADVANCE MOLE @ 10 MIN/LF
* INSTALL RING = 45 MIN / 4 LF = 11 MIN/LF
TOTAL RATE = 21 MIN/LF
(60 MIN/HR)(1 LF/21 MIN) = 2.86 LF/HR

ADVANCE RATE/DAY = (15 HRS/DY)(2.86 LF/HR) = 42.86 LF/DAY

CALL 43 LF/DAY

* MAY BE ABLE TO ADVANCE MOLE WITHOUT RING INSTALLATION & IMPROVE ADVANCE RATE SIGNIFICANTLY

** USE PUENTE/FERNANDO RATE OF ADVANCE FOR BASALT IN BRACCIA

*** USE DRY/WET SAND RATE OF ADVANCE FOR SAN PEDRO FORMATION

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-23-83

From HEB

Subject SCRTD METRO RAIL
TUNNEL PRODUCTION RATE

GROUT CYCLE

GROUT VOL/LF = $\pi(9.835^2 - 9.665^2)/27 = .386$ CY/LF

USE 3 CY PUMP @ 50% = 1.5 CY/HR

LF GROUT/HR = (1.5 CY/HR)(1 LF/.386 CY) =

3.89 LF/HR CALL 4 LF/HR

PUMP DURING TBM SCH MAINT & DURING PRODUCTION

21 HRS AVAIL X 4 LF/HR = 84 LF MACH ADV RATE
BEFORE EXC CYCLE IMPACT
BY GROUT

MAX. AVE. ADV. RATE

DRY/WET SAND

MACHINE AVAILABILITY = 24 - 3 - (3)(½) - (3)(½)
= 18 HR/DY

ADVANCE RATE ASSUMING NO DELAY FOR RING INSTALLATION
= 3 LF/HR

MAX. AVE. RATE ADV/DY = (18 HR/DY)(3 LF/HR) = 54 LF/DY

PUENTE/FERNANDO

MACHINE AVAILABILITY = 18 HR/DY

ADV. RATE = 6 LF/HR

MAX. AVE. RATE ADV./DY = (18 HR/DY)(6 LF/HR) = 108 LF/DY

P1

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-24-83

From HKB

Subject SC RTD METRO RAIL
TUNNEL LABOR COST

WORK WEEKS OF TWIN BORE - ALL REACHES = 526.2

COMPOSITE LABOR COST/WORK WEEK =

(25 MEN/HOG - SH)(2 HOG)(3 SH/DY)(5 DY/WK)(8 HR/DY)($27/HR)

= $162,000/WW

($162,000/WW)(526. WW) = $85,212,000 INCL FRINGE & BURDEN

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-24-83

From HLB

Subject SCRTD METRO RAIL TUNNEL CREWS & SUPPORT

CRAFT LABOR		DAY	SWING	GRAVEYARD	TOTAL
SUPPORT CREW					
CRANE OR HOIST OPR. (MUCK)		1	1	1	3
CRANE OR HOIST OILER (MUCK)		1	1	1	3
TOPMAN		1	1	1	3
BULL GANG LEADER		1	1	1	3
BULL GANG LABORERS		3	2	2	7
SHOP MECHANIC FOREMAN		1	—	—	1
SHOP MECHANICS		3	1	1	5
ELEC FOREMAN		1	—	—	1
ELECTRICIANS		2	1	1	4
COMPRESSOR OPERATOR		1	1	1	3
	TOTAL	15	9	9	33
HEADING CREWS					
WALKER OR SHIFTER		2	2	2	6
ELECTRICIAN		2	2	2	6
TBM OPERATOR		2	2	2	6
TBM OILER		2	2	2	6
TRAILING FLOOR OPER.		2	2	2	6
LOCI OPERATORS		5	5	5	15
LOCI BRAKEMEN		5	5	5	15
MECHANIC		2	2	2	6
TRACK LAYER	MINERS	2	2	2	6
UTILITY MAN	MINERS	2	2	2	6
ALIGNMAN	MINERS	2	2	2	6
LINER MAN	MINERS	2	2	2	6
GROUT MAN	MINERS	2	2	2	6
	TOTAL	32	32	32	96
OTHER SUPPORT					
YARD CRANE OPERATOR		1	1	1	3
YARD CRANE HELPER		1	1	1	3
WAREHOUSEMAN		1	1	1	3
	TOTAL	3	3	3	9
TOTAL W/SUPPORT		50	44	44	138

AVE MEN/HEADING SHIFT = $\frac{138}{6}$ = 23 CALL 25*

(ADD 1 STREET SWEEPER GRAVEYARD SHIFT ∴ AVE = 23.17)

& IN ALLOW. FOR UNKNOWNS

* ADD 2 MEN/HEADING/SHIFT FOR UNKNOWNS
ELEC OPR, CARPENTER, ETC

P3

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-24-83

From HEB

Subject SCRTD METRO RAIL
CRAFT COMPOSITE LABOR RATE

SOURCE : MEANS

FROM CRAFT LABOR WORKUP (138 + 12)

FOREMEN (OUTSIDE)	8 EA	@ 20.70 AVE	=	165.60
SKILLED WORKERS	126 EA	@ 18.70 AVE	=	2356.20
LABORERS	16 EA	@ 14.45 AVE	=	231.20

54 SURFACE
96 U/G — ADD $1/HR FOR U/G — 96.00

54 DAY SHIFT
96 SWING & GRAVEYARD — ADD 0 $/MH SHIFTDIFF 43.00

$2897

$\frac{\$2897}{150\ MEN} = 19.30\ /MH$ WITH FRINGE

ASSUME 1.083 PREMIUM PAY FACTOR*
ASSUME 1.300 BURDEN FACTOR

AVE COMPOSITE HRLY RATE = (19.30)(1.083)(1.300)
= 27.19 /MH

CALL 27 $/MH WITH FRINGE O.T. & PAYROLL TAXES

* ASSUME 40 HR W.W. WITH 5% SPOT O.T.
½ HR TRAVEL TIME/DAY @ ST. TIME

PREMIUM PAY FAC = $\frac{42\frac{1}{2} + (40)(.05)(1.5)}{(40)(1.05)} = 1.083$

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-26-83

From HEB

Subject SC RTD METRO RAIL

TUNNEL PERM. MAT'L

RINGS (ASSUME 4LF RINGS IN 6 PRECAST & REINFORCED SEGMENTS)

RING SEGMENT U.C. = $250.00

LF OF TUNNEL = 79810 LF X 2 = 159620

SEGMENTS REQUIRED = $\frac{159620\ LF}{4\ LF/RING}(6\ SEG/RING) \times 1.02$ BREAKAGE

= 244219

∴ SEGMENT COST = (244219 SEG)($250/6 SEG)

= 61,055,000

ALLOW 350/RING FOR BOLTS, CAULKING, GASKETS, ETC

RINGS = $\frac{159620\ LF}{4\ LF/RING}$ = 39905

COST = (39905 RINGS)($350/RING) X 1.05 LOSS

= 14,665,000

GROUT

GROUT REQ'D = 61568 CY X 1.10 LOSS = 67725 CY

PEA GRAVEL = $25/CY

CEMENT 6 SACKS/CY @ $4/SACK = $24/CY

CAN COST CY = $50

GROUT COST = (67725 CY)($50/CY) = $3,386,000

TOTAL MAT'L COST = $79,106,000

	Initials	Date
Prepared by	HRB	3-25-83
Approved by		

SC RTD EQUIPMENT SPREAD SHEET (EXC, LINE & GROUT ONLY)

$ x 1000

EQUIPMENT	DISTRIBUTION	QUANTITY	UNIT PRICE	EXTENSION	SALVAGE	PROJECT COST	MONTHLY RENTAL RATE	AVE MONTHS OF SERVICE	PROJECT COST $ X1000	PROJ COST SUMMARY $ X1000
TBM (REP ZOKOR)	6x2	12 EA	2000	24000	4000	20000				20000
TBM (ROBBINS)	1x2	2 EA	3500	7000	1000	6000				6000
TBM TRAILING GEAR (ZOKOR)	6x2	12 EA	500	6000	1000	5000				5000
TBM TRAILING GEAR (ROBBINS)	1x2	2 EA	1000	2000	400	1600				1600
20 TON DIESEL LOCIS	5x4+2x6	32 EA	95	3040	1963	1077				1077
8 CY MUCK CARS	5x20+2x24	148 EA	18	2664	1720	944				944
FLAT CARS	7x6	42 EA	18	756	488	268				268
6 CY AGITATOR CARS	7x4	28 EA	34	952	615	337				337
MAN CARS	7x2	14 EA	20	280	181	99				99
3 CY/HR GROUT PUMPS W/POTS	7x2	14 EA	18	252	163	89				89
5 TON TUGGERS	7x4	28 EA	5	140	90	50				50
1200 CFM SCRAWFARD ELEC. COMP.	7x2	14 EA	55	770	497	273				273
900 CFM " " " "	7x2	14 EA	45	630	407	223				223
OIL SWITCH & MISC ELEC. EQUIP	7x2	14 LOTS	150	2100	1356	744				744
125 HP, 60,000 CFM FANS (REV. W/ STARTER)	1EA/2000LF/HDG	78 EA	8	624	403	221				221
PUMPS? 5 HP FLYGT	7x10	70 EA	3	210	136	74				74
MISC SHOP EQUIP.	7x1	7 LOTS	30	210	136	74				74
MISC TUNNEL EQUIP.	7x2	14 LOTS	30	420	271	149				149
2½ TON 4x2 FLAT BED	7x1	7 EA	25	175	113	62				62
4½ CY FEL, DIESEL	7x1	7 EA	275	1925	1244	681				681
70 TON CRAWLER DIESEL CRANE	7x1	7 EA					12730	17	1515	1515
20 TON HYDR. DIESEL CRANE	7x1	7 EA					4270	17	508	508
PICKUPS (IN OH)	—		IN OH				IN OH			IN OH
BUILDINGS (IN OH)	—									
TEMP CONST. (IN OH)	—									
TOTAL				54148	16183	37965			2023	39988
							SALES TAX & FRT (10%)			3999
								TOTAL EQUIP		43987

PRACTICAL
FORM 516

QUANTITY SHEET

PROJECT SC RTD METRO RAIL | ESTIMATOR HEB | ESTIMATE NO.

LOCATION | EXTENSIONS | SHEET NO.

ARCHITECT ENGINEER | CHECKED | DATE 3-25-83

CLASSIFICATION QUAN. TAKE OFF

DESCRIPTION	NO.	DIMENSIONS	ESTIMATED QUANTITY	UNIT
TUNNEL EXC.		(19.67 OD X 79810 LF X 2)		
		TOTAL CY EXC. W/ SWELL = $(2)(79810)(\pi)\left(\frac{19.67}{2}\right)^2(1.5)/27$		
		= 2694719		
		TOTAL CY EXC. W/O SWELL = 2694719 / 1.5		
		= 1796479		
		REACH 12 CY EXC W/O SWELL = $(2)(16154)(\pi)\left(\frac{19.67}{2}\right)^2/27$		
		= 363618		
BACKFILL GROUT		(19.67 OD, 19.33 ID X 79810 LF X 2)		
		TOTAL CY BACKFILL GROUT = $(2)(79810)(\pi)\left[\left(\frac{19.67}{2}\right)^2-\left(\frac{19.33}{2}\right)^2\right]/27$		
		= 61568		

MFD. IN U.S.A. FRANK R. WALKER CO., PUBLISHERS, CHICAGO

A1

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-25-83

From HEB

Subject SCRTD METRORAIL

FAN ANALYSIS (W/ ALLOWANCE TAKEN FOR HOUR THAW)

FANS REQ'D

REACH 2	2 x 3	6
REACH 5	2 x 4	8
REACH 6	2 x 6	12
REACH 8	2 x 3	6
REACH 10	2 x 5	10
REACH 12	2 x 11	22
REACH 14	2 x 7	14
		78 EA

FAN DAYS

REACH 2

3 x 306 = 918
2 x 1500 = 3000
1 x 1500 = 1500
2 x 361 = 722
1 x 1500 = 1500
2 x 657 = 1314
1 x 1500 = 1500

2 (10454 FAN FT) / (30.77 FT/DY) = 679 FAN DAYS

REACH 5

4 x 301 = 1204
6 x 1500 = 9000
3 x 1429 = 4287
3 x 1500 = 4500
2 x 1038 = 2076
1 x 1500 = 1500

(22568)(2) / 40.72 = 1108 FAN DAYS

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-25-83

From HEB

Subject SCRTD METRO RAIL

REACH 6

1 x 1472 = 1472
6 x 1507 = 9042
15 x 1500 = 22500
(33014)(2)/39.10 = 1689 FAN DAYS

REACH 8

2 x 968 = 1936
1 x 1500 = 1500
3 x 1437 = 4311
3 x 1500 = 4500
1 x 332 = 332
(12579)(2)/35.30 = 713 FAN DAYS

REACH 10

4 x 436 = 1744
6 x 1500 = 9000
5 x 320 = 1600
10 x 1500 = 15000
4 x 406 = 1624
6 x 1500 = 9000
(37968)(2)/41.34 = 1837 FAN DAYS

REACH 12

11 x 1154 = 12694
55 x 1500 = 82500
(95194)(2)/(41.31) = 4608 FAN DAYS

REACH 14

7 x 1688 = 11816
21 x 1500 = 31500
(43316)(2)/25.82 = 3356 FAN DAYS

TOTAL FAN DAYS = 13990

	Initials	Date
Prepared by	HEB	3-25-87
Approved by		

SC RTD EQUIPMENT MAINT. MAT'L & OPERATING COST (EXC. LINE & GROUT ONLY)

EQUIPMENT	MAINT. MAT'L CALC.	MAINT. MAT'L $X1000	OPERATING COST CALC.	OPERATING COST $X1000
ZOKOR TBM & TRAILING GEAR	($4/CY)(1432861 CY)	5731	(800 HP)(.746)($0.06/KWH)(5 HR/DY)(2 HDGS)(5 DY/WK)(60 WKS)	2400
ROBBINS TBM & TRAILING GEAR	($8/CY)(363618 CY)	2909	(1200 HP)(.746)($0.06/KWH)(15 HR/DY)(2 HDGS)(5 DY/WK)(78 WKS)	443
20 TON DIESEL LOCOS	($3.20/HR-EA)(32 EA)(.8)(16 HR/DY)(5 DY/WK)(69 WK)	609	($4.25/HR-EA)(32 EA)(.8)(16 HR/DY)(5 DY/WK)(69 WKS)	755
8 CY MUCK CARS	($0.25/CY)(2697479 CY)	674	—	—
FLAT CARS	($5/DY-EA)(42 EA)(.8)(5 DY/WK)(69 WK)	58	—	—
6 CY AGITATOR CARS	($2.50/CY)(67725 CY)	169	—	—
MAN CARS	($5/DY-EA)(14 EA)(1.0)(5 DY/WK)(69 WK)	24	—	—
3 CY/HR GROUT PUMPS	($1/CY)(67725 CY)	68	—	—
1200 CFM COMPRESSORS	($3.15/HR-EA)(14 EA)(1.0)(12 HR/DY)(5 DY/WK)(75 WK)	198	($22.40/HR-EA)(14 EA)(1.0)(12 HR/DY)(5 DY/WK)(75 WK)	1411
900 CFM COMPRESSORS	($2.40/HR-EA)(14 EA)(.2)(12 HR/DY)(5 DY/WK)(75 WK)	30	($16.20/HR-EA)(14 EA)(.2)(12 HR/DY)(5 DY/WK)(75 WK)	204
ELECTRICAL GEAR	($10/DY-LOT)(14 LOTS)(.7)(5 DY/WK)(75 WK)	37	— SOME LOSS, BUT NOT CALCULATED	—
125 HP FANS	($0.50/HR)(24 HR/DY)(13990 FAN DAYS)	17	(125 HP)(.746)($0.06/KWH)(24 HR/DY)(13990 DAYS)	2818
5 HP FLYGT PUMPS	($0.05/HR-EA)(70 EA)(.5)(24 HR/DY)(7 DY/WK)(69 WK)	61	(5 HP)(.746)($0.06/KWH)(24 HR/DY-EA)(70 EA)(.5)(7 DY/WK)(69 WK)	136
70 TN. CRANE	($7/HR-EA)(7 EA)(1.0)(12 HR/DY)(5 DY/WK)(75 WK)	221	($10/HR-EA)(7 EA)(1.0)(12 HR/DY)(5 DY/WK)(75 WK)	315
20 TN CRANE	($3/HR-EA)(7 EA)(1.0)(12 HR/DY)(5 DY/WK)(75 WK)	94	($7/HR-EA)(7 EA)(1.0)(12 HR/DY)(5 DY/WK)(75 WK)	220
SHOP EQUIP. (MISC.)	($100/MO-LOT)(7 LOTS)(1.0)(75 WK)/4.33	12	(75 KW)($0.06/KWH)(10 HR/DY)(5 DY/WK)(75 WK)	25
TUNNEL EQUIP. (MISC.)	($100/MO-LOT)(14 LOTS)(1.0)(69 WK)/4.33	22	—	—
2½ TN FLAT BED	($0.25/HR-EA)(7 EA)(1.0)(6 HR/DY)(5 DY/WK)(75 WK)	4	($13/HR-EA)(7 EA)(1.0)(6 HR/DY)(5 DY/WK)(75 WK)	205
4½ CY FEL	($3/HR-EA)(7 EA)(1.0)(8 HR/DY)(5 DY/WK)(75 WK)	63	($12/HR-EA)(7 EA)(1.0)(8 HR/DY)(5 DY/WK)(75 WK)	252
TUNNEL LIGHTING	($100/MO-HDG)(14 HDGS)(.5)(69 WK)/4.33	11	(100/1000 KW)(29700 LF/10 LF)(.5)($0.06/KWH)(24 HR/DY)(5 DY/WK)(69 WK)	297
BUILDINGS (IN OH)	—	—	—	—
PICKUPS (IN OH)	—	—	—	—
TOTAL		10912		10481

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

P1

To

Date 3-24-83

From HRB

Subject SCRTD METRO RAIL

TUNNEL TEMPORARY UTILITY LINES & RAIL

1.) WATER LINE - 109 WALL 4" WITH VIC COUPLINGS, NIPPLES & VALVES — $4/LF

2.) COMPRESSED AIR LINE - 109 WALL 8" WITH VIC COUPLINGS, NIPPLES & VALVES — $10-/LF

3.) DEWATERING LINE - 109 WALL 8" WITH VIC COUPLINGS & MANIFOLDING — $10-/LF

4.) VENT LINE - (FOR 60,000 CFM, 125 HP FANS TO HANCOCK 2 EA 20 TN LOCIS @ 25,000 CFM/EA) 36" WITH COUPLERS & ELBOWS (FANS EVERY 1500 LF, COST IN EQUIPMENT) — $5-/LF

5.) LOW VOLTAGE ELEC. W/ LIGHTS STEP DOWN TRANSFORMERS (@ 2500/EA) EVERY 1500 LF — $5-/LF; $2.30/LF

6.) POWER CABLE TO TBM (800 HP, 1000 MCM) WITH JOY PLUGS — $8-/LF

7.) TELEPHONE LINE — $2-/LF
PHONE ($6000/EA) EVERY 2000 LF — $0.30/LF

8.) RAIL & TIES - USED 80 LB RAIL INCL. TIES, SWITCHES, TURNOUTS, SAKES & BOOTS @ $200/TN, ASSUME 70 LB/LF — $7-/LF

CALC'S NEXT PAGE

ALLOWANCE FOR SMALL TOOLS & SUPPLIES $1.00/MH

MH = (25 MEN/HR-SH)(2 HDG)(3 SHIFTS/DY)(5 DY/WK)(52.2 WKS)(84

= 3,157,200 MH

(3157200 MH)(1.00/MH) = 3,157,200

CALL $3,157,000

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-24-83

From HEB

Subject SCRTD

UTILITY COST

ASSUME ALL UTILITIES CARRIED THRU STATIONS BUT VENT LINE
REUSE VENT LINE AFTER HOLE THRU

ALL UTILITIES BUT VENT LINE = $48.60/LF

FOOTAGE

REACH	LF
2	8586
5	13745
6	11133
8	8632
10	17992
12	16154
14	10688
TOTAL	86930 LF

(86930 LF)($48.60/LF) = $4,224,798

VENT LINE = $15-/LF

FOOTAGE REQ'D (LONGEST RUNS IN REACH)

REACH	LF
2	3300
5	4800
6	9000
8	4400
10	6300
12	16200
14	10700
TOTAL	54700

(54700 LF)($15-/LF) = $820,500

P3

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-24-83

From HEB

Subject SCRTO

TOTAL UTILITY COST = (4,224,798 + 820,500) 2

= 10,090,596

CALL 10,091,000

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-26-83

From HEB

Subject SC RTD METRO RAIL
MUCK DISPOSAL

GENERALLY SUBCONTRACTED

TYPICALY RUNS FROM $4.50 TO $5.00/CY

FOR L.A., $6.00/CY IS PROBABLY OK

& SCATTER - NO. IS REASONABLE

SEE QUAN CALC. SHEET

TOTAL TUNNEL EXC. W/SWELL = 2,695,000 CY

2,695,000CY X $6/CY = $16,170,000

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-27-83

From HEB

Subject SC RTD

CROSS PASSAGES - ASSUME 6W x 8H x 30 L FINISHED

DURATION

PER PASSAGE

DRILL BLAST & MUCK	3 DAYS
FORM POUR & STRIP	3 DAYS
INVERT & CLEANUP	1 DAY
	7 DAYS/EA

PERM. LIGHTING, ETC STAGGERED NO DUR. IMPACT

NO. OF PASSAGES

REACH 2	13 EA
5	21 EA
6	19 EA
8	12 EA
10	30 EA
12	31 EA
14	20 EA
TOTAL	146 EA

(146 EA)(7 DAYS/EA) + (7 REACHES)(5 DAYS LEARNING/EA)
= 1057 DAYS

1057 DAYS/146 EA = 7.24 DAYS/EA
1.44 WW/EA

ASSUME CONSTRUCTION OF CROSS PASSAGES CONCURRENT WITH TUNNEL CONSTRUCTION.

COST

NORMAL COST 6x8 FINISHED IS $1000 - $1800/LF
ASSUME CONSERV. CASE + ALLOWANCE FOR LIGHTING & TIGHT SEAL

COST = (146 EA)(30 LF/EA)($1500/LF)(1.25 ADJ. FAC.)
= $8,212,500 /146 = $56250/EA

CALL 8,213,000

KELLOGG
5601 South Broadway
Littleton, Colorado 80121
303/794/1818

To

Date 3-27-83

From HEB

Subject SC RTD

STEEL LINER

52804 11770 ?

STEEL LINER TAKE OFF QUANTITY OF 17050 LF TWIN BO
ACCEPT MATERIAL COST OF $721/LF CALL $720/LF TWIN BORE

LABOR & PLANT

TUNNEL L&P

LABOR EX TRMS	143,000/WW
EQUIP EX TRMS	15,000/WW
MAINT MAT'L EX TRMS	4,000/WW
ELEC, FUEL, ETC EXTRMS	13,000/WW
ST&S EX TBM	3,000/WW
TOTAL	178,000/WW

REDUCTION FOR PROJ PHASE

LABOR	30%	100,000/WW
EQUIP	20%	12,000/WW
M.M.	40%	2,000/WW
CONS.	40%	8,000/WW
ST&S	30%	2000/WW
		124,000/WW

ACCEPT PRODUCTION RATE OF 78 LF/DY CALL 80LF/DY

MATERIAL COST = (17050 LF)($720/LF) = $12,276,000
L&P COST = (17050 LF)($124,000/WW)(1WW/5DY)(80LF/DY)
= 5,285,500

TOTAL COST = $17,561,500 CALL $17,560,000

P1

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-26-83

From HLB

Subject SCRTD

FINISH TUNNEL

ROUGH EST OF U.C./LF = $115 (see backup)

COST = (2 HOG)(7981 LF/HOG)($115/LF) = 18,356,300

CALL 18,356,000

GROUND H.O CONTROL IN REACH 2

SMALL NO., LIMITED BASIS DATA
ACCEPT EST OF $500,000

SHIELD PIT IN REACH 12

SMALL NO., ACCEPT EST OF $391,000

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3-26-83

From HEB

Subject SC RTD

FINISH TUNNEL - U.C. EST.

HISTORY 1972 PROJ SAME CONFIGURATION & SIZE

$57/LF USING FORM @ 50 LF/DAY
(EX LABOR FRINGE & BURDEN)

ASSUME $57 IS 40% L = 22.80
ADD 50% FOR FRINGE & BURDEN = 34.20

COST/LF = 57 - 22.80 + 34.20 = 68.40

($68.40/LF)(2.0 ESC FAC.) = 136.80/LF IN 1982

ASSUME MECH. APPROACH YIELDS ONLY 15% REDUCTION IN U.C.

(.85)(136.80/LF) = $116/LF

U.C. PASS 1

DURATION = $\frac{79810}{300}$ + 7×15 + 7×5 = 406 DAYS = 81 WKS

REDUCED P&L COST (FROM STEEL LINER ITEM) = $124,000/WK

CHK PASS 2

L&P = 81 WKS @ $124,000 = 10,044,000
MAT'L = 79810×2×50 = 7,981,000
TOTAL 18,025,000

COST/LF = $\frac{18,025,000}{79810 \times 2}$ = $113/LF

CALL $115/LF

	Initials	Date
Prepared by	HEB	3-28-83
Approved by		

SC RTD REACH DURATIONS

	TIME ALLOTMENT (DAYS)	REACH 2	REACH 5	REACH 6	REACH 8	REACH 10	REACH 12	REACH 14	TOTAL	AVE	CAL
1	A_1, A_3 & SP @ 26LF/DY	119	—	17	56	—	—	373			
2	A_2, A_4, C & 1-5 @ 43LF/DY	98	274	233	134	376	376	23			
3	LEARNING TIME @ 15 DY	15	15	15	15	15	15	15			
4	ASSEMBLY & LAUNCH @ 30 DY	30	30	30	30	30	30	30			
5	MODIFY TBM @ 3 DY/EA	6	—	3	—	—	—	3			
6	SKID THRU STA & TURN UNDER @ 15 DY/EA	30	30	15	15	30	—	—			
7	DISMANTLE & REMOVE @ 15 DY	15	15	15	15	15	15	15			
8											
9	* TUNNEL SUB - TOTAL (DYS)	313	364	326	265	466	436	459			
10	* TUNNEL SUB - TOTAL (LNFT)	626	728	656	530	932	872	918	5262	752	75
11											
12	CROSS PASSAGES (500'C-C)	CONCURRENT INSTALLATION WITH TUNNEL — NO SCHEDULE TIME							—		
13	STEEL LINER (8KLF/DAY)	—	30.3	—	13.2	—	—	—	43.5	6.2	6
14	FINISH TUNNEL (300LF/DY +20)	8.9	11.8	11.0	8.8	14.8	14.8	11.1	81.2	11.6	12
15	MOB / DEMOB & CLEANUP	19.0	19.0	19.0	19.0	19.0	19.0	19.0	133.0	19.0	19
16	GROUND HOG LOWERING (6WKS)	CONCURRENT WITH MOB — NO SCHEDULE TIME							—	—	—
17	SHIELD DIT (4WKS)	CONCURRENT WITH MOB — NO SCHEDULE TIME							—	—	—
18	SET UP FOR FINISH DURING ST. EXC. (3WKS/EA)	—	(3.0)	—	(3.0)	—	—	—	(6.0)	(0.9)	(1)
19											
20	CONSTRUCTION TOTAL DURATION	90.5	130.9	95.6	91.0	127.0	121.0	121.9	777.9	111.1	111
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

* EXC, LINING & BACKFILL GROUT

APPENDIX C - STATION SHELL

[redacted]

STATION SHELL CONSTRUCTION SUMMARIES

STIMSONS 3-24-82

DOL

		TOTAL CHANGE DIRECT.
		#
1	4th. St	167000
2	1ST Hill	430000
3	5TH Hill	1100000
4	7th Flower	175000
5	Alvarado	114000
6	Vermont	90000
7	Normandie	120000
8	Western	140000
9	La Brea	160000
10	Fairfax	900000
11	Beverly	65000
12	Santa Monica	150000
13	Sunset	160000
14	Hollywood	170000
15	Universal	225000
16	No Hollywood	175000
		* 4,541,000 ✓

SUMMARY - STATION SHELLS
FOR COMPARATIVE PURPOSES ONLY*

3-24-65 LOL

No	STATION	DIRECT COST SUMMARY DMJM-PB&D	KC
1	UNION	# 11,304,000 ✓	# 11,471,000 ✓
2	1ST. HILL	13,300,000 ✓	13,930,000 ✓
3	5TH HILL	18,660,000 ✓	19,760,000 ✓
4	7TH FLOWER	14,917,000 ✓	15,092,000 ✓
5	ALVARADO	3,869,000 ✓	3,983,000 ✓
6	VERMONT	7,370,000 ✓	7,460,000 ✓
7	NORMANDIE	8,720,000 ✓	8,840,000 ✓
8	WESTERN	12,170,000 ✓	12,310,000 ✓
9	LA BREA	12,292,000 ✓	12,452,000 ✓
10	FAIRFAX	25,582,000 ✓	26,482,000 ✓
11	BEVERLY	12,675,000 ✓	12,740,000 ✓
12	SANTA MONICA	10,035,000 ✓	10,185,000 ✓
13	SUNSET	12,338,000 ✓	12,498,000 ✓
14	HOLLYWOOD	12,210,000 ✓	12,380,000 ✓
15	UNIVERSAL	22,254,000 ✓	22,479,000 ✓
16	NO HOLLYWOOD	12,884,000 ✓	13,061,000 ✓
		210,582,000 ✓	215,123,000 ✓

* NOTE: DEWATERING - UNDERPINNING - UTILITY SUPPORT - TRAFFIC MAINTENANCE AND PARKING GARAGES STILL INCLUDED.

GCO - BONDING & PROFIT EXCLUDED.

(1)

UNION STATION SHELL

3-23-83

ONE LEVEL - TYPE "B"

DDL

640' L 66-9 W 29 T 34.5 D

ITEM	DESCRIPTION	DMJM-PBQD		KC		CHANGE
		Q	$	Q	$	
(1)	DEMOLITION		300,000		300,000	—
(2)	EARTHWORK					
	EX. MACH				271,600	
	EX HAND				187,000	
	COMP BE				177,700	
	SOIL DISP		2,764,160		398,000	—
	SOLD PILE/LAG				1,463,000	
	DECKING				256,000	
	DEWATER		—		—	
					2,753,300	PUSH
(3)	CONCRETE					
(A)	FORMS		1,601,000		1,601,000	—
(B)	CONC.					
	PLACE		511,400		600,000	+166,600
	SUPPLY		1,518,000		1,518,000	
	OVERRUN		—		78,000	
					2,196,000	
(C)	REBAR		2,218,600		2,218,600	—
(D)	CURING		14,200		14,200	—
(E)	FINISHING		279,400		279,400	—
(4)	WATERPROOF		85,100		85,100	—
(5)	SITE REST.		1,045,000		1,045,000	—
(6)	TRAFFIC		—			
(7)	UTIL SUPT.		—			
(8)	MOB		434,800		434,800	—
						+ 167,000

(2) 3-23-83

1ST & HILL ST. STA. SHELL 004

OVER-UNDER TYPE "E"

631 L 62-9 W 66-10 2

	ITEM	DESCRIPTION	OMJM-PBOD	KC	CHANGE
1					
2	(1)	DEMOLITION	50650	50600	—
3					
4	(2)	EARTHWORK			
5		EX. MACH		700000	
6		EX HAND		187000	
7		COMP B.F.		263000	
8		SOIL DISP	5933000	833,000	+440000
9		SOLD PILE		3539000	
10		" STAIRS		365550	
11		DECKING		486000	
12		UNDERPIN	—	—	
13		DEWATER	—	—	
14					
15				6,774,000	
16					
17	(3)	UTILITIES			
18					
19	(4)	MOBILIZATION			
20					
21	(5)	CONCRETE			
22	(A)	FORMS	—	—	—
23					
24	(B)	CONC			
25		PLACE	650400	750,000	
26		SUPPLY	1784200	1784000	
27		OVERRUN		90000	
28					
29			2434000	2624000	+190000
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40				CALC +	630,000

(3) 5TH & HILL ST STA SHELL 5-23-83

OVER UNDER TYPE E ODL

631 L 1 62-9 N 2 86-6 O 3 4 5

ITEM	DESCRIPTION	DMJM PROD	KC	CHANGE
(1)	DEMOLITION	—	—	—
(2)	EARTHWORK			
	EX. MACH	540000	900000	
	EX HAND	208550	181000	
	COMP BF	957300	957000	
	EX SOIL DISP.	813000	973000	
	SOLD PILE	5598000	6,084,000	
	DECK ROAD	819500	705000	
	DECK SW	39600	39600	
	UNDERPIN	—	—	
	DEWATER	—	—	
		8976000	9,848,000	872,000
(3)	UTIL			
(4)	MOB			
(5)	CONCRETE			
(A)	FORMS	—	—	
(B)	CONC.			
	PLACE	474300	570000	
	SUPPLY	1343850	1343850	
	OVERRUN	—	90000	
		1818000	2003000	185000
			CACL	100000

3-23-83

(4) 7TH & FLOWER STA. SHELL

ONE LEVEL TYPE "A" DOL

740 L 1 62-9 W 2 53 D 3 4 5

ITEM	DESCRIPTION	DMNM	PROD		MC	CHANGE
(1)	DEMO		—		—	—
(2)	EARTHWORK					
	EX MACH				490 000	
	EX HAND				187 000	
	COMP BF				509 000	
	SOIL DISP.		5 430 000		447 000	
	SOLD PILE LAG & STRUTS				3049 000	
					216 000	
	DECKING RD & SIDEWK				509 760	
					35 600	
	UNDERPIN		—		—	
	DEWATER		—		—	
					5440 000	—
3	MAJOR UTILITIES		—		—	—
4	MOB.		—		—	—
5	CONCRETE					
(A)	FORMS					
(B)	CONC					
	PLACE		474 300		569 000	
	SUPPLY		1 344 000		1 344 000	
	OVERRUN		—		80 000	
			1818 000		1 993 000	+ 175 000

+ 175 000

(5) ALVARADO STATION SHELL 3-23-83

ONE LEVEL TYPE "B" DAL

ITEM	DESCRIPTION	1 DUNN	2 P&G	3	4 KC	5
(1)	DEMO.		—		—	—
(2)	EXCAVATION					
	EX MACH				113 000	
	EX HAND				187 000	
	COMP BE		3062,000		644 000	
	SOIL DISP				220 000	
	SOLD PILE/LAG				1680 000	
	DECK				55 000	
	DEWATER		—		—	
					3059,000	PUSH
(3)	UTILITY		—		—	
(4)	MOB		—		—	
(5)						
(A)	FORMS		—		—	
(B)	CONCRETE					
	PLACE		254 000		328 000	
	SUPPLY		830 000		830 000	
	OVERRUN				40 000	
			1084 000		1198 000	+ 114,000
						+ 114 000

(6) VERMONT AVE STA 3-23-83
SINGLE TYPE "B" DOL
567 L 66-8 N 45-10 O

	ITEM	DESCRIPTION	DMJM	PBBD	KC	CHANGE
1						
2	(1)	DEMO		—	—	—
3						
4	(2)	EARTHWORK				
5		EXCAV MACH			312 000	
6		EX. HAND			165 000	
7		CAMP BF		3144 000	50 400	
8		SOIL DISP			507 000	
9		SOLD PILE			2040 000	
10		DECK			59 000	
11		DEWATER		—	—	—
12						
13					3133 000	-100 000
14						
15	(3)	UTILITY				—
16						
17	(4)	MOB				—
18						
19	(5)	CONCRETE				
20	-A-	FORMS		—	—	—
21						
22	-B-	CONCRETE				
23		PLACE		355 000	405 000	
24		SUPPLY		1077 000	1077 000	
25		OVERRUN			50 000	
26						
27				1432 000	1537 000	100 000
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						

+ 90 000

(7) NORMANDIE AVE STA 3-23-83

ONE LEVEL TYPE C DOL

672-L 65W 42T 64D

ITEM	DESCRIPTION	DMJM PB&D	KC	CHANGE
(1)	DEMO			—
(2)	EARTHWORK			
	EX. MACH	328000	605000	
	EX HAND	130000	187000	
	COMP BF	750000	750000	
	SOIL DISP	493000	629000	
	SOLD PILE	3208000	2830000	
	STAIRS	120000	120000	
	DECKING RD	579000	515000	
	WALKS	25000	25000	
			PUSH	
		5653000	5661000	+ 8000
(3)	UTIL.			—
(4)	MOB			—
5	CONCRETE			
A	FORMS			—
B	CONC			
	PLACE	428000	563000	
	SUPPLY	1225000	1225000	
	OVERRUN		36000	
		1653000	1764000	+ 111000
				+ 120000

(8) WESTERN AVE STA 3-24-83

ONE LEVEL TYPE "C" DRL

660 L x 64-3 W 46-4 T 54-3 D

	1 ITEM	2 DESCRIPTION	3 DRUM-PROD	4 KC	5 DIFF.
1					
2	(1)	DEMO	—	—	—
3					
4	(2)	EARTHWORK			
5					
6		EX MACH		567000	
7		EX HAND		187000	
8		COMB BF		469000	
9		SOIL ASP		625000	
10		SOLD PILE LAG	4922900	2370000	
11		" SMALL		210000	
12		DECK ROAD		506000	
13		WALER		18000	
14		DEWATER	—	—	—
15		UNDERPIN	—	—	—
16					
17				4952000	+30000
18					
19	(3)	UTILITIES			—
20					
21	(4)	MOBILIZATION			—
22					
23	(5)	CONCRETE			
24					
25		(A) FORMS			—
26					
27		(B) CONCRETE			
28					+ 70
29		PLACE	448000	510000	
30		SUPPLY	1265000	1265000	
31		OVERRUN		40000	
32					
33					
34			1713000	1832000	110000
35					
36					
37					
38					
39					
40					+ 140000

(9) LA BREA WILSHIRE 3-24 83 DDL

660 ℄ 65 W 45-6 T 5750

ITEM	DESCRIPTION	DM/JM	PB&O	KC	CHANGE
(1)	DEMO		—	—	—
(2)	UTILITIES				
(3)	MOB.				
(4)	CONCRETE				
(A)	FORMS		—	—	—
(B)	CONC.				
	PLACE		472000	547000	
	SUPPLY		1343000	1343000	
	OVER RUN		—	40000	
			1815000	1930000	115000
(5)	WATERPROOF				—
(6)	SITE REST.				—
(7)	EARTHWORK				
	EX MACH. HAND			538000	
	CONC BE			137000	
	SOIL DISP.		5037000	391000	
	SOLD PILE			627000	
	SHALLOW			2520000	
	ROAD DECK			235000	
	WALK DECK			56000	
	DEWATER		—	29000	—
				5083000	46000
				CA=4	160000

(10) FAIRFAX STA. SHELL 3-24 83

DDL

TWO LEVEL TYPE "E"

935' L 1 | 65 W 2 | 66-8 T 3 | 84 4 | 5

ITEM	DESCRIPTION	DMJM	PBGA	KC	CHANGE
(1)	DEMO	—		—	—
(2)	EARTHWORK				
	EXC. MACH			1099000	
	EXC HAND			310000	
	COMP BACKFILL			188000	
	EX. SOIL DISP		1757000	1627000	
	SOLD PILE LAG			571200	
	SHORE EXITS			99800	
	DECK RD			71600	
	ENTRIES			61000	
				12700000	646000
(3)	CONCRETE				
(A)	FORMS	—		—	—
(B)	CONC.				
	PLACE		928000	1068000	
	SUPPLY		2510650	2510650	
	OVERRUN			120000	
			3438000	3698000	260000

CA/L 906000 ✓

BEVERLY FAIRFAX

11 DDL

685 L 628 W 27-3 T 42

ITEM	DESCRIPTION	DMJM	PBSQ	KC	DIFF
(1)	DEMO		—	—	—
(2)	EARTHWORK				
	EX MACH			350000	
	HAND			187000	
	COMP BF		3839000	487000	
	SOIL DISP			376000	
	SOLD PILE			1883000	
	DECKING			506000	
	DEWATER		—	—	—
				3789000	-50000
(3)	CONCRETE				
	(A) FORMS		—	—	—
				+96	
	PLACE		300000	390000	
	SUPPLY		839000	839000	
	OVERRUN			25000	
			1139000	1254000	115000
4	WATERPROOF				—
5	SITE				—
6	UTILITIES				—
7	MOB				—
8	TRAFFIC				—
					65000

3/24/83

12 SANTA MONICA STA 2DL

680L 1 65W 2 46-3 3 45 4 5

ITEM	DESCRIPTION	OMJM PB&D	KC	CHURCH
(1)	DEMO	—	—	—
(2)	EARTHWORK			
	EX MACH		399000	
	EX HAND		187000	
	CAMP BF		—	
	SOLD DISP	4245000	654000	
	SOLD PILE		1933000	
	RD DECK		52,000	
	DECK SW		480000	
	UNDERWATER		4196000	49,000
3	UTILITIES			—
4	MOBILIZATION			—
5	CONCRETE			
(A)	FORMS			—
(B)	CONCRETE			
	PLACE	423000	488000	
	SUPPLY	1221000	1221000	
	OVERRUN	—	38000	
		1644000	1747000	103000

SAY + 150000

3-24-83
DAL

13 LA BREA SUNSET

6906 1 65W 2 46-3 3 55 4 D 5

ITEM	DESCRIPTION	DM/M	DBAR	KC	CHANGE
(1)	DEMO				—
(2)	TRAFFIC				—
(3)	EARTHWORK				
(4)	EX MACH			518000	
	EX HAND			187000	
	COMP BF			297000	
	SOIL DISP		5035000	667000	
	SOLD PILE			2375000	
	DECK RD			529000	
	DECK WALK			61000	
	SOLD PILE SW			245000	
				5079000	44000
(5)	UNDERPIN				—
(6)	CONCRETE				
(A)	FORMS				—
(B)	CONCRETE				
	PLACE		457000	532000	
	SUPPLY		1304000	1304000	
	OVERRUN			40000	
			1761000	1876000	115000
					160000

14

HOLLYWOOD CAHUENGA 3-24-83

DOL

690 L 65 W 46-3 T 550

ITEM	DESCRIPTION	DMJM PBQD	KC	CHATIFF
(1)	DEMO			—
(2)	TRAFFIC			—
(3)	EARTHWORK			
(4)	Ex Mach	} 3840000	469000	
	Ex Hand		187000	
	Comp BF		274000	
	Ex Muck Disp		614000	
	Sold Pile		2310000	
	Deck.		61000	
	DEWATER	—	—	—
			3915000	
				75,000
(5)	UNDERPIN			
(6)	CONCRETE			
(A)	FORMS	—	—	—
(B)	CONCR			
	PLACE	407000	467000	
	SUPPLY	1,165000	1,165000	
	OVERRUN	—	36000	
		1,572000	1,668000	96,000
(7)	WATERPROOF			
(8)	SITE			—
(9)	UTILITY			—
(10)	MOB			—
				[illegible]
			[illegible]	17,000

15 UNIVERSAL 3-24-82

630 L 65 W 46 T 550 DDL

	ITEM	DESCRIPTION	OMAHA PBQD	KC	CHANGE
1					
2	(1)	DEMO	—	—	—
3					
4	(2)	TRAFFIC	—	—	—
5					
6	(3)	EARTHWORK			
7					
8	(4)	EX. MACH		464,000	
9		EX HAND		187,000	
10		COMP BF	3783000	274,000	
11		SOIL DISP.		607,000	
12		SOLD. PILE		2370000	
13		DECK	—		
14					
15		DEWATER		3,902,000	
16					119,000
17					
18					
19	(5)	UNDERPIN	—	—	—
20					
21	(6)	CONCRETE			
22					
23	(A)	FORMS	—	—	—
24					
25	(B)	CONCR.			
26					
27		PLACE	403000	473000	
28		SUPPLY	1152000	1,152,000	
29		OVERRUN	—	36,000	
30					
31			1555,000	1,661,000	106,000
32					
33	(7)	WATER PR.			—
34					—
35	(8)	SITE			—
36					
37	(9)	UTIL			—
38					
39	(10)	MOB			—
40					

205,000

16 NORTH HOLLYWOOD

3-24-83
DOL

ITEM	DESCRIPTION	DMJM ABBD	KC	CAHILL
(1)	DEMO	—	—	—
(2)	EARTHWORK			
	EX MACH		605000	
	EX HAND		187000	
	COMP BE		750000	
	SOIL DISPOSAL		591000	
	SOLD PILE/LAG	565200	2925000	
	~ SHORS		120000	
	DECKING RD		515000	
	DECK BRACES		25000	
	DEWATERING	—	—	—
			5718000	66,000
(3)	UTILITIES			
(4)	MOB.			
(5)				
(A)	FORMS	—	—	—
(B)	CONCRETE			
			75	
	PLACE	429000	504000	
	SUPPLY	1225000	1225000	
	OVERRUN		37000	
		1654000	1766000	112000
(6)	WATERPROOF			—
(7)	SITE			—
(8)	TRAFFIC			—
				175000
			CAHILL	

STATION SHELL CONSTRUCTION - QUANTITY CHECKS

SCRTD 3-15-83
KC - DOL

CHECK ESTIMATE

UNION STATION

EARTHWORK:

QUANTITIES ROUGH CUT:

EXCAV. $\frac{640 \times 66.75 \times 34.5}{27} = 54,587$ CY = 54525 DMJM ✓

EXCAV. HAND: UNDER DECKING AND AROUND UTILITIES - DMJM ALLOWS AREA x 2 FT THICKNESS — PROBABLY OK.

COMP. BACKFILL $\frac{640 \times 66.75 \times 5.5}{27} = 8700$ CY ? — 11,280 DMJM ✓

EXCESS SOIL DISPOSAL

54587 - 11,280 = 43307 x SWELL FACTOR

SAY 30% = 56,300 CY — 59,600 DMJM ✓

DECKING: 640 x 66.75 = 47,720 SF — 42,670 DMJM ✓

SOLDIER PILE / LAGGING:

$(640 + 640 + 66.75 + 66.75) \times 34.5'$

$= 1413.5 \times 34.5 = 48765 \rightarrow 48760$ DMJM ✓

DEWATERING: SCHEDULE SHOWS 2½ YEARS TOTAL CONSTRUCTION - DMJM ALLOWS 16 MOS. DEWATERING - PROBABLY IN THE LOW AREA 16-18 MOS - OK

SCRTD 3-15-83
KC DDL

CHECK ESTIMATE

WESTERN AVE.

EARTHWORK:

QUANTITIES ROUGH CK:

EXCAV. $\frac{660 \times 648 \times 54.5}{27} = 86,260$ — DMJM 93830 ✓

+ ENTRANCE —

EXCAV: HAND UNDER DECKING AND @ UTILITIES

HERE DMJM ALLOWS 5% THIS IS ABOUT 3 FT - OK OVERALL. ✓

COMP. BACKFILL $\frac{660 \times 64.75 \times 19\frac{1}{2}}{27} = 30078 - 29780$ DMJM ✓

EXCESS SOIL DISP.: 98770 - 29780 = 68990 C.Y. × SWELL

SAY 30% = 89687 — DMJM 93700 ← OK ✓

DECKING: $660 \times 64.75 = 42735 \rightarrow$ DMJM 42900 ✓

SOLDIER PILE & LAGGING:

$(660 + 660 + 64.75 + 64.75) \, 54.5$

$1449.5 \times 54.5 = 78,998 \rightarrow$ DMJM 79,030 ✓

+ ENTRANCE - OK.

DEWATERING: SCHEDULE SHOWS STAGE I AT 2 YEARS - DMJM ALLOWS 18 MONTHS IN THE WET OK.

STATION SHELL CONSTRUCTION - EXCAVATION

SUMMARY

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-15-83

WESTERN STATION

Sheet 0 of 7 Estm RLL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. EXCAVATION

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
REMOVE UPPER	5000 CY			(SHEET # 3)					$ 106,220				
REMOVE NEXT	8000 CY			(SHEET # 4)					$ 80,681				
REMOVE BULK	86000 CY			(SHEET # 6)					$ 554,625				
MISC (SURGE BIN - DUST)				(SHEET # 7)					$ 50,000				
									$ 791,526				

KC $ 791,526 / 99,000 CY = $ 8.00 /C.Y.

DMJM $ 428,200 / 98,770 CY = $ 4.34 /CY

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRIP DATE 3-15-83

WESTERN STATION

Sheet 1 of 7 Estm DPL Ckd V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity 9,830 C.Y.

Item Desc. EXCAVATION - MACHINE

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR		REP. LABOR		MAT'L		SUB-BID		E.O.E.		TOTAL	
		UNIT	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT

ASSUMPTIONS:

THE TOP SEVERAL FEET UNDER DECKING AND AROUND SUSPENDED UTILITIES WILL BE A COMBINATION OF MACHINE AND HAND MUCKING. THIS COULD BE BUCKED UP WITH A COMBINATION OF SMALL LOADERS AND HAND EFFORT AND REMOVED WITH CONVEYORS OR SMALL RUBBER TIRED CRANES.

MINE SHAFTS AND MINE HOISTS MIGHT BE EMPLOYED. DEEP CUT -

MUST ASSUME THAT OFF SITE DISPOSAL WILL NOT BE PERMITTED DURING RUSH HOURS .·. SOME TYPE OF HOLDING BIN OR FACILITY MUST BE CONSTRUCTED TO HOUSE EXCAVATED MATERIAL UNTIL OFF SITE DISPOSAL IS ALLOWED.

FOR THIS ESTIMATE A CONVENTIONAL SPREAD OF DOZERS OR LOADERS (BELOW DECKING) WILL BE EMPLOYED FOR BUCKING MATERIAL TO A CENTRAL SURGE AND CRANE / CLAMSHELL REMOVAL ON THE DECKING WITH OUTRIGGER RUBBER TIRE MTG.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-15-83

WESTERN STATION.

Sheet 2 of 7 Estm DDL Ckd V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity 93,930 C.Y.

Item Desc. EXCAVATION - MACHINE

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
PIONEER OR DEVELOP 200 PLUS FEET OF THE SOLDIER PILE & DECKED AREA WITH SMALL MACHINE / LOADER AND HAND OPERATION WORKING AROUND UTILITIES TO A DEPTH DEVELOPING A GOOD HEAD ROOM AREA THEN FOLLOW (IN ABOUT 30 DAYS) WITH HEAVY EXCAVATION SPREAD.													
DMJM ALLOWED 4940 CY OF HAND OR SHALLOW OPERATION PREDICT WILL NEED 7 FT UNDER DECK BEAMS OR 8 PLUS FEET TOTAL BEFORE COMPLETELY FREE FOR HEAVY EQUIPMENT MASS OPERATION.													
AGREE IN PART W/ABOVE THAT 5000 CY OR TOP THREE FEET SLOW OR SAY 30 C.Y. /HR TOP EFFICIENCY OR AT 80% SAY 25 C.Y. /HR.													
∴ 5000 CY / 25 = 200 HRS - MONTH PLUS OK.													
TAKE NEXT 5 FEET OR 8000 ± CY AT 60 C.Y. /HR OR A TOTAL OF 8000/60 = 134 HRS MONTH MINUS OK.													
NOTE: TRAFFIC CONTROL & DECK REMOVAL SCHEDULING MUST BE CLOSELY MAINTAINED AS MUCH OF THE ABOVE MUST BE ACHIEVED WITH DECK SECTIONS OFF.													

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRID DATE 3-15-83

WESTERN STATION

Sheet 3 of 7 Estm. DDL Ckd. ~ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity 5000 C.Y.

Item Desc. EXCAVATION

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
REMOVE UPPER 5000 C.Y. OR 3± FT BELOW DEPTH.													
5000 CY / 25 CY = 200 HRS.													
FOREMAN OPER.	1	33 00		-		-		33 00		33 00			
1½-CY CRANE	1	63 00		42 50		21 40		126 90		126 90			
FRONT END LOAD	1	30 00		7 00		5 50		42 50		42 50			
DOZER D6	1	30 00		16 75		13 25		~~60 00~~		~~60 00~~		60 00	
STINGER CRANE	½	30 00		19 50		14 10		63 60		31 80			
FOREMAN LABOR	1	28 00		-		-		28 00		28 00			
LABORERS	3	26 00		-		-		26 00		78 00			
TRUCK	2	28 00		12 50		17 00		57 50		115 00			
PU	1	—		2 70		3 20		5 90		5 90			
										521 10		✓	
SMALL TOOLS										10 00			
										~~531 10~~			
										531 10		OK	

∴ 200 HRS @ ~~521 10~~ 531 10/HR = #106,220 ✓

-135-

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-15-83

WESTERN STATION

Sheet 4 of 7 Estm DRL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. EXCAVATION

FORM E240R HOECKEL'S 336481

DEP FOH FOG ADJ.

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
REMOVE HEAD ROOM AREA OF 8000 ± C.Y. BELOW DECK.													
8000 / 60 = 134 HRS.													
FOREMAN OPER	1		33.00		—		—				33.00		33.00
1½ CY CRANE	1		63.00		42.50		21.40				126.90		126.90
FRONT END LOAD.	1		30.00		7.00		5.50				42.50		42.50
DOZER D6	1		30.00		16.75		13.25				50.00		50.00
DOZER D8	1		30.00		44.00		31.00				105.00		105.00
STINGER CRANE ½	½		30.00		19.50		14.10				63.60		31.80
FOREMAN LAB	1		28.00		—		—				28.00		28.00
LABORERS	2		26.00		—		—				26.00		54.00
TRUCK	2		28.00		12.50		17.00				57.50		115.00
P.U.	1		—		2.70		3.20				5.90		5.90
											592.10		✓
SMALL TOOLS											10.00		
											602.10		
∴ 134 HRS @ 602.10/HR = $80,681													

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-15-83

WESTERN STATION

Sheet 5 of 7 Estm DDL Ckd V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. EXCAVATION

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT

DMVM SHOWS A TOTAL OF 98,770 CY OF STATION EXCAVATION.

REMOVAL OF TOP 8 FT = 13,000 CY OR CALL 86,000 CY OF EXCAVATION BY HEAVY OR MASS REMOVAL.

USING A 3½ C.Y. BUCKET AND ALLOWING A SWELL FACTOR. OR SAY 110,000 C.Y. EXCAVATION

CYCLE TIME TO MID DEPTH OF CUT SAY 30 FEET ALLOW ONE MIN FIT 100% EFFICIENCY.

SAY 80 % EFFICIENCY. = CALL 1¼ MIN CYCLE @ 3 CY = 144 CY/HR

110,000 CY @ 144 CY/HR = 765 HRS MUCK TIME.

100 WORK DAYS ON SINGLE SHIFT OR MULTIPLE IF PERMITTED. (ALLOW 1 WK. UP TO SPEED)

4 MONTHS TOTAL EXCAVATION -

PROBABLY WOULD GO 5-10s OR 6-9s AND ACCOMPLISH IN 3 MOS.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-15-80

Sheet 6 of 7 Estm DDL Ckd K ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. EXCAVATION

FORM E240R HOECKEL'S 936481

DEPTH FOG ADJ.

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
EXCAVATE HEAVY.													
110000 CY EXCAV @ 144 CY/HR = 765 HRS OPER.													
FOREMAN OPER.	1		33.00		-		-		33.00		33.00		
CRANE 3 1/2 C.Y.	1		63.00		95.50		48.00		206.50		206.50		
D 6 DOZER	1		30.00		16.75		13.25		60.00		60.00		
STINGER CRANE	1		30.00		19.50		14.10		63.60		63.60		
D 8 DOZERS	1		30.00		44.00		31.00		105.00		105.00		
FOREMAN - LAB	1		28.00		-		-		28.00		28.00		
LABORERS	2		26.00		-		-		26.00		52.00		
FLAGMEN - DUMPMEN	2		26.00		-		-		26.00		52.00		
DUMP TRUCKS	2		28.00		12.50		17.00		57.50		115.00		
PICK UP.	2		—		2.70		3.20		5.90		5.90		
											721.00		
SMALL TOOLS											4.00		
											725.00		
∴ 765 HRS @ 725/HR =									554,625				

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-15-83

Sheet 7 of 7 Estm DOL Ckd V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. EXCAVATION

FORM E240R HOECKEL'S 336461

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
DUST - WHEEL CLEANERS - GENERAL CONTROL - TRAFFIC ETC.													
CONSTRUCT MAINTAIN SURGE BINS													
1100 HRS - SOME OVERLAP CALL 800 HRS.													
FOREMAN	(FROM GENERAL SPREAD)												
LABORERS 2		26.00									52.00		
PU	(FROM GENERAL SPREAD)												
CLEAN FACILITIES LS	(BELOW)												
800 @ 52.00 = 41,600													
SURGE BIN (ERECT - DISMANTLE)							5000						
DUST FACILITIES							2,500						
CALL							#50,000						

STATION SHELL CONSTRUCTION - SOLDIER PILE AND LAGGING

SUMMARY

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-16-83

WESTERN STATION

Sheet 0 of Estm DR Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. SOLDIER PILE / LAGGING

FORM E240R HOECKEL'S 336461

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
DRILL PILING	(SHEET #4)												185,060
PILE SEATING	(SHEET #5)												205,070
LAGGING / STRUTS	(SHEET #6)												393,260
MATERIALS	(SHEET #7)												1,614,440
													# 2,397,830 ✓

KC # 2,397,830 / 80,000 = # 29.97 CALL # 30.00

OMJM # 2,687,000 / 79,030 = # 34.00 / LF

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD. DATE 3-15-83

WESTERN STATION

Sheet 1 of 7 Estm. DDL Ckd. V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity 88,000#'

Item Desc. SOLDIER PILE / LAGGING

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
SOLDIER PILE & LAGGING.													

THE ASSUMPTIONS FOR SOLDIER PILE & LAGGING:

PILING TO BE PLACED ON 8 FT. CENTERS WITH THE HOLES PREDRILLED TO NEAR INVERT AND THE FINAL 10 FT STUCK OR DRIVEN.

PIPE OR STRUCTURAL STRUTS SPANNING THE EXCAVATION WILL BE SPACED AT 14 FT. CTRS VERTICALLY THEREFORE WESTERN WILL HAVE A PILE CAP STRUT (SUPPORTING THE DECKING) PLUS 3 STRUT LAYERS SPACED AS EXCAVATION PROGRESSES.

LAGGING ASSUMED SOLID WILL BE 3" TO 4" THICK AS DEPTH INCREASES.

LONG. GIRDERS WILL CARRY LOADING AS REQUIRED.

NOTE & MAKE ALLOWANCE.

NOTE: NO OVERHEADS TO HAMPER OPERATIONS

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-15-83

WESTERN STATION

Sheet 2 of 7 Estm Ckd ✓ ITEM

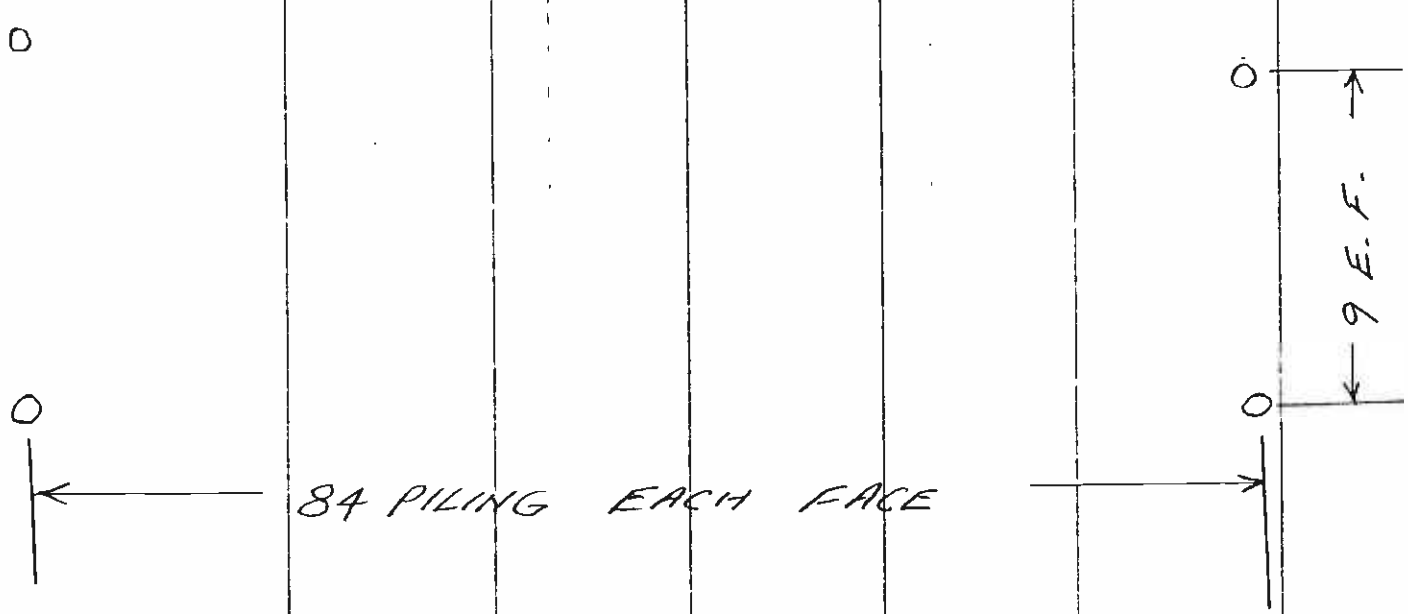
Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity 88,000 D'

Item Desc. SOLDIER PILE / LAGGING

FORM E240R HOECKEL'S 336461

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT



PRE DRILLED PILING 186 EACH.

186 x 65 = 12,100 FT. @ 120 #/FT. = 730 TON

STRUTS 106 EACH @ 65' = 7000 FT @ 80# 280 TON

GIRDERS / WHALERS = 2800 FT @ 150 # = 210 TON

1220 TON

PLUS CAPS - GUIDE ETC — CALL 1300 TON

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-16-83

Sheet 3 of 7 Estm DK Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity 80,000 ft²

Item Desc. SOLDIER PILE / LAGGING

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT

THE PRE DRILLED PILING HOLES WILL BE DRILLED AT A RATE OF 4 HOLES PER DAY AFTER UP TO SPEED.

186 HOLES @ 4 = 46.5 DAYS.
ALLOW BREAK IN = 1 WEEK CALL 52 SHIFTS

AS A SPECIALIZED ITEM THE PILE EXCAVATION & DRIVING WILL PROBABLY BE A SUB CONTRACT ITEM.

ASSUME THE HOLES DRILLED & CAPPED AND THAT THE PILE SETTING, & STICKING WILL FOLLOW BY APPROX 3-4 WEEKS AS THIS OPERATION SHOULD PROCEED AT 8 ± PILE PER DAY (TWICE AS FAST)

THE STUCK PILE HOLES WILL THEN BE FILLED WITH LEAN CONCRETE

LAGGING, OF COURSE WILL FOLLOW EXCAVATION DOWN - BY SMALL CREW.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTP DATE 3-16-83

WESTERN STATION DEPOT FOG

Sheet 4 of 7 Estm DPL Ckd V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity 80,000 #'

Item Desc. SOLDIER PILE / LAGGING

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
DRILL PILING													
FOREMAN	420 HR	35.00							35.00				14,700
DRILL RIG	420			72.00		38.00			110.00				46200
OPERATOR	420	33.00							33.00				13860
OILER	420	28.00							28.00				11760
RIGGER	420	30.00							30.00				12600
PILE BUTTS	840	26.00							26.00				21,840
FLAT BED	420	23.80		7.00		4.40			39.40				16550
DUMP TRUCK	420	28.00		12.50		17.00			57.50				24150
FLAGMAN	420	26.00							26.00				10920
PICK UP	420	—		2.70		3.20			5.90				1480
MISC. DRILL SUPPLIES		MUD - CASINGS ETC											10,000
													# 185,060

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRIP DATE 3-16-83

WESTERN STATION DEP & OH FOG

Sheet 5 of 7 Estm DRL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. SOCRIER PILE / LAGGING

FORM E240R HOECKEL'S 336491

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
PILE SEATING													
FOREMAN	300 Hr	35.00							35.00				10500 ✓
PILE DRIVER	300			140.-		110.-			250.00				75000 ✓
OPERATOR	300	33.00							33.00				9900 ✓
OILER	300	28.00							28.00				8400 ✓
RIGGER	300	30.00							30.00				9000 ✓
PILE BUTTS	900	26.00							26.00				23400 ✓
FLATBED	300	28.00		7.00		4.40			39.40				11820 ✓
BOOM TUGGER	300	28.00		16.00		8.40			52.40				15720 ✓
FLAGMAN	300	26.00							26.00				7800 ✓
PICK UP	300	—		2.70		3.20			5.90				1770 ✓
WELDER	300	30.00		3.20		6.00			39.20				11760 ✓
MISC. DRIVE SUPPLIES - WELD - CABLE - HOOKS - RIGGING -													20000 ✓
													$ 205,070 ✓

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-16-83

Sheet 6 of 7 Estm DRL Ckd K ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. SOLDIER PILE - LAG.

FORM E240R HOECKEL'S 336481

DEP - OH FOG

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
LAGGING / STRUT SPREAD GEAR TO EXCAVATION:													
EXCAVATION 1099 HRS - 5% OVERLAP - CALC 1050 HR													
FOREMAN	1050		35.00						35.00				36750
CRANE (STINGER)	1050		32.00		19.50		14.10		65.60				68880
CRANE - PICK -	200	(CREW)	91.00		72.00		38.00		201.00				40200
FLAT RACK	1050		28.00		7.00		4.40		39.40				41370
LABORERS	3150		26.00						26.00				81,900
IRON WORKERS	2100		30.00						30.00				63000
WELDER	1050		30.00		3.20		6.00		39.20				41,160
MISC SUPPLIES - WELDING - SLINGS - WEDGING													20,000
													$ 393,260

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-16-83

WESTERN STATION

Sheet 7 of 7 Estm DRL Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. SOLDIER PILE / LAGGING

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
MATERIALS													
STRUCTURAL STEEL													
SHAPES	1300 TON					1000 **							1,300,000
GUSS-CLIPS . .	5%												65000
TIMBER													
LAGGING	280 M					500 -							140,000
WEDGES - . .													5000
CONCRETE													
FILL HOLES	1860 C.Y.					40 **							74,440
MISC-													30000
													1,614,440

STATION SHELL CONSTRUCTION - DECKING

SUMMARY

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-17-83

WESTERN HVE STATION

Sheet 1 of 1 Estm DAE Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity 42,900 □'

Item Desc. DECKING

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
DECKING	ROADWAY			42,900	□'								
DECKING	WALKWAY			3000	□'								
				45 900	□'								
KC DECKING INSTALLATION & MAINT.									# 483,636				
NON SKID APPLICATION 50% AREA @ 25¢ = 22950 @ 25¢									57,375				
									# 541,011				
KC	541,000 / 45 900 =					# 11.79	/ □'						
DMJM	606,600 / 45,900 =					13.22	/ □'						

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-16-83

WESTERN STATION

Sheet 1 of 4 Estm DDL Ckd V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity 42,900 □'

Item Desc. DECKING

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT

THE DECKING WILL BE DOUGLAS FIR - STRUCTURAL GRADE - 12"x12" CABLED TOGETHER IN SECTIONS RANGING FROM 12 TO 20 FOOT SECTIONS. THE SECTIONS INSTALLED TO PROVIDE SEATING THAT WILL ALLOW UNIFORM TRAFFIC FLOW AND YET PROVIDE EASY REMOVAL AND RESEATING.

CITY TRAFFIC CONTROL MAY REQUIRE THAT SOME NON SKID PROVISION BE REQUIRED FOR RAINY WEATHER / SLIPPERY CONDITIONS.

TAKE OFF: 660 x 65 = 42,900 → OMJM 42 900 □' ✓

SIDEWALK ALLOWANCE 3000 □'

42,900 □' x 12" THICK = 515 M.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-16-83

WESTERN STATION

Sheet 2 of 4 Estm DDL Ckd K ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DECKING

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR		REP. LABOR		MAT'L		SUB-BID		E.O.E.		TOTAL	
		UNIT	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT

MAKE UP STREET DECKING SECTIONS:

THE 12 x 12 TIMBERS WILL BE THREADED WITH 5/8 INCH CABLE INTO SECTIONS OR SQUARES TO FIT THE CONTRACTORS SELECTED PILE CAP/STRINGER CONFIGURATION.
FOR ESTIMATING USE 16 FT SQUARE SECTIONS.

42,900 D' / 256 = CALL 170 SECTIONS.

MAKE UP DECKING - DECKING, FOR THE MOST PART WILL BE REHANDLED BY EXCAV./PILE CREWS. HOWEVER MAKE SOME ALLOWANCE

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-16-83

WESTERN STATION

Sheet 3 of 4 Estm DOL Ckd V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DECKING

DEP-OH FOG

FORM E240R HOECKEL-S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
STREET DECICING													
MATERIAL & ASSEMBLY													
MAKE UP INSTALL REFIT 4 PER /DAY													
MTLS:													
DECKING STREET	515M							600					309080 V
DECKING SIDEWALK	10 M							500					5000 V
CABLE	12000 LF												18000 V
CLAMPS / SHACKLES	LS												4000 V
CREW:													
FOREMAN	340 HR	33 00						33 00					11220 V
CRANE SMALL	340 HR	30 00		19 00		14 10		63 60					21624 V
CARPENTERS (2)	680 HR	28 00						28 00					19040 V
LABORER	340 HR	26 00						26 00					8840 V
SM. TOOLS	L.S.												2000 V
FLAT-BED	340 HR	28 00		7 00		4 40		39 40					13396 00 V
DECK-REHANDLE	ALLOW-	(PAGE 4)											-0-
												#	412120 V

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB 5CRTD DATE 3-16-83

WESTERN STATION

FORM E240R | KECKEL'S 336481

Sheet 4 of 4 Estm DDL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DECKING

DEC. FOG

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
												#	412120 ✓
PAGE 3 FORWARD													
WALKWAY DECKING													
CARD FORE	60 HR		33.00						33.00				1980 ✓
CARPENTERS	120		28.00						28.00				3360 ✓
LABORER	60		26.00						26.00				1560 ✓
FLATRACK	60		28.00			7.00	4.40		39.40				2364 ✓
SM. TOOLS	LS										NIL		-
REHANDLE DECKING	ALLOW 8 HRS/WK FOR DECKED PERIOD SAY 18 MO.												
FOREMAN	FROM MAIN SPREAD												
CRANE	620 HR		30.00		19.50		14.10		63.60				39432 ✓
PICK MAN	620 HR		26.00						26.00				16120 ✓
CARPENTER 20%	150 HR		28.00						28.00				4200 ✓
MISC						INCL	SM. TOOLS						2500 ✓
												#	483,636 ✓

STATION SHELL CONSTRUCTION - CONCRETE

STATION CONCRETE STUDY

No.	Station		Walls < 15" CY	Walls > 15" CY	Elev Slabs CY	Grade Slabs CY	Columns Pilasters CY	Beams CY	Blast Shelt Walls CY	Total Concrete CY	Total Forms/□' Form Ratio	Total Rebar Ratio	9 − 4 =	Total Concrete $	Concrete $/CY
1	Union Station	1/B	275	9647	6746	10453	552	704	615	29192	257940" / 8.83	5838400" / 200		6142550	210
2	1st & Hill	2/E	2191	12937	8375	7890	810	2100	4 ?	34311	446743 / 13.44	7205600 / 210		8070600	235
3	5th & Hill	2/E	2316	15699	9541	12268	957	2800	* ?	43582	542170 / 12.44	9184150 / 210		10174450	233
4	7th & Flower	1/A	400	9027	5402	8920	388	1646	4 ?	25849	260652 / 10.08	5168600 / 200		5387450	208
5	Wilshire/Alv.	1/B	575	1048	6310	6039	692	—	1310	15964	104727 / 6.56	3192600 / 200		2952100	186
6	Vermont	1/C	247	2310	4840	10475	1330	1441	—	20843	157583 / 7.55	4144600 / 198		4062720	195
7	Normandie	1/C	544	3387	4835*	8624	3708	1846	615	23559	279820 / 11.87	4711800 / 200		5249850	228
8	Western	1/C	1086	3772	4781	8783	2043	2024	1842	24331	281841 / 11.58	4802600 / 197		5499000	226
9	La Brea	1/C	1424	3947	5249	9140	3641	1843	615	25819	279231 / 10.81	5163700 / 200		5727000	221
10	Fairfax	2/E	943	18090	10645"	10679	1142	2214	3565	48280	474134 / 9.69	9656000 / 200		10722500	222
11	Beverly	1/B	272	4402	1622	7074	350	1448	968	16136	185749 / 11.5	3222200 / 200		3719450	230
12	Santa Monica	1/C	544	4028	4794	8727	3752	1624		23419	284683 / 12.1	4625800 / 200		5335800	227
13	Sunset		578	4366	5019	8850	3807	1832	615	25072	282676 / 11.27	5014400 / 200		5635150	225
14	Hollywood		596	3219	4532	8150	3503	1796	615	22411	263292 / 11.77	4482200 / 200		5091650	227
15	Univ City		590	3196	4454	8085	3476	1752	615	22148	253604 / 11.45	4430000 / 200		4731800	213
16	N. Hollywood		544	3387	4835	8624	3708	1846	615	23539	274820 / 11.6	4712000 / 200		5735090	243

-153-

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-17-83

WESTERN AVE STATION

Sheet 1 of 1 Estm DDL Ckd / ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CONCRETE SUMMATION

FORM E240R HOECKEL'S 936491

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
RECOMMEND THAT AN ALLOWANCE FOR OVER RUN CONCRETE BE MADE.													
NEAT LINE	24331 CY										SAY ALLOW		
ADDED 4%	1000 CY										@ $52 =		$52,000
UNIT PRICING OF MASS CONCRETE ABOUT 20% LIGHT	15483 C.Y.										REC. INCR $5/CY		
	15483 × 5 =												$77,500
INCREASE COLUMNS	342										@ $40 =		$13,700
BEAMS-/SLABS COMBINED													OK
INCREASE CONCRETE PLACE											SAY		$150,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-17-83

WESTERN STATION

Sheet 1 of 12 Estm. DNL Ckd. ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CONCRETE

FORM E240R HOECKEL'S 336461

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT

TAKE OFF - QUANTITIES:

WALL FORMS: (660 + 660 + 65 + 65) 47 = 68,150 □'

INTERIOR (400 + 240) (16 + 8) = 15 360 □'

DMJM

14,550 + 9940 + 52,680 + 4050 = 83,500 □' → 81,220 □' ✓

TOTAL FORMS 281,840 □' ✓ = #1,758,740

1,758,740 / 281,840 = #6.24 / □' ✓

TOTAL CONCRETE 24,331 C.Y. = #1,714,900 = #70.48 / C.Y. ✓

FORM RATIO = 281,840 / 24331 = 11.58 □' / C.Y.

REBAR RATIO = USED 197# DMJM SAYS 200 OK.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD WESTERN STATION. DATE 3-17-83

Sheet 2 of 12 Estm DDK Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CONCRETE.

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
TOTAL IN WESTERN AVENUE FOR CONCRETE & APPURT.													
FORMS:			1,758,700			/ 24 331		=				72	28
CONCRETE:			1,714,900			/ 24,331		=				70	48
CURE			13,900			/ 24 331		=					57
FINISH			186,500			/ 24 331		=				7	67
			$ 3,674,000			/ 24,331		=			$	151	00
REBAR		$	1,825,000			/ 24,331		=			$	75	00
			5,499,000			/ 24,531		=			$	226	00

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-17-83

WESTERN AVE STA.

Sheet 3 of 12 Estm DM Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CONCRETE

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
CONCRETE:													
TOTAL CONCRETE	24,331 C.Y.												
MASS TO SEMI MASS CONCRETE OR CONCRETE THAT CAN BE PLACED AT HIGH RATE OF PRODUCTION													
GRADE SLAB	8783 CY					36% OF TOTAL							FAST/CRANE
EXTERIOR WALLS	4858 C.Y.					20% OF TOTAL							SEMI FAST
BLAST WALLS	1842 CY					8% OF TOTAL							" "
						64% FAIRLY HI SPEED.							

NOTE: THIS CONCRETE WILL REQUIRE SOME TYPE OF LOWERING WITH CRANE & TRUNKEE INTO THE WALL SECTIONS.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD. DATE 3-17-93

WESTERN AVE STATION

Sheet 4 of 12 Estm DDL Ckd ~ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CONCRETE

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT

SPREAD TO PLACE A PORTION OF THE INVERT SLAB - THIS SLAB CONTAINS A NEAT LINE QUANTITY OF 8783 CUBIC YARDS - ASSUME BULK HEAD OFF AND POUR OUT IN 4 - WEEKS OR AT RATE OF 440 NEAT PER POUR.

440 + 5% OVERRUN = 465 C.Y.

PLACING RATE - SET UP POUR FOR 10 HR DAY WITH A 9 HR PRODUCTION.

ALLOW ONE HOUR - CLEAN UP & READY POUR

465 / 9 = 52 C.Y. / HR.

CONCRETE CAN BE LOWERED AND 90% PLACED DIRECTLY IN PLACE.

ALLOW SOME IRISH BUGEY & CHUTE WORK.

52 C.Y. / HR WITH A 3 CY BUCKET PAY

2½ CY = 52 / 2.5 = 21 CYCLES PER HR.

60 MIN / 21 = 3 MIN CYCLE @ 133% EFF

UNION 20 ... 24 ... 2½ MIN - 75% EFF OR

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-17-83

WESTERN AVE STA

Sheet 5 of 12 Estm DDL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CONCRETE

OH-DEP FOG

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
INVERT SLAB PLACING.	440 CY NEAT												
DECK CREW													
FOREMAN	10 HR	35.00							35.-				350
CRANE	10 HR			98.50		51.00			149.50				1495
OPER	10 HR	33.00							33.00				330
OILER	10 HR	30.00							30.00				300
HOOKMAN	10 HR	28.00							28.00				280
P.U.	10 HR			2.70		3.20			5.90				60
INVERT CREW													
FOREMAN	10 HR	35.00							35.00				350
VIBRATORMEN 3	30 HR	29.00		3.50		1.60			35.10				1053
LABORERS 3	30 HR	28.00							28.00				840
CARPENTER	10 HR	30.00							30.00				300
BUGGIES - CHUTES ETC													100
OVER RUN CONCR	20 CY @ 50												1000
	6458 / 440 = 14.68												6,458.00

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-17-83

WESTERN AVE STATION

Sheet 6 of 12 Estm DDL Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CONCRETE

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
ELEVATED SLAB PLACING.													
THE ELEVATED SLABS ARE SLIGHTLY LESS MASSIVE THAN THE INVERT SLAB -													
SAY 2 FT FOR ROOF AND 12" FOR MEZZANINE WITH 8 INCH FOR PLATFORM.													
THE SLABS WILL MOSTLY HAVE TWO LAYERS OF REBAR HENCE REDUCING PRODUCTIVITY AND VIBRATION REQUIREMENTS WILL BE INCREASED.													
SAY 60% PRODUCTION ATTAINED WHEN RELATED TO THE INVERT.													
WITH PROPER SCHEDULING, HOWEVER, PLACING FROM THE TOP DECK SHOULD OFFER NO GREAT PROBLEM													
CYCLE INCREASED TO 5 MIN AT EFFICIENCY													
9 HRS @ 2½ CY x 12 = 270 C.Y. /HR													
SAY 10 CY OVERRUN.													

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-17-83

WESTERN AVE STA.

Sheet 7 of 12 Estm DDL Ckd V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CONCRETE

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
TAKE OFF													
TOP SLAB.	580 x 50 x 2 = 58000 CF												
	470 x 30 x 1½ = 21150 CF												
	450 x 28 x .75 = 9450 CF												
	88600 CF / 27 = 3280 CY.												
	OMJM = 4781 (50% MORE. SLAB THICKNESS)												
	∴ ASSUME ELEVATED SLAB THICKNESS AVERAGE = 2 FT OVERALL												
	STILL IN RATHER MASSIVE POURS.												
	∴ CALL 80% PRODUCTION. OR 4 MIN CYCLE												
	15 EA @ 2½ CY @ 9 HR = 337 C.Y.												

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-12-85

WESTERN AVE STATION

Sheet 8 of 12 Estm DM Ckd K ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CONCRETE -

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
ELEVATED SLAB SPREAD						337 CY / NEAT.							
DECK CREW													
FOREMAN	10 HR							35 -					350
CRANE	10 HR							149 50					1495
OPER	10 HR							33 00					330
OILER	10 HR							30 00					300
HOOKMAN	10 HR							28 00					280
PU	10 HR							5 99					60
INVERT CREW													
FOREMAN	10 HR							35 00					350
VIBRATOR MEN	20							35 10					700
LABORERS	30							28 00					840
CARP	10							30 00					300
BUGGIES CHUTES													100
OVER RUN	10	C.Y.											500 -
													$ 5605 00

5605 / 337 = 16 65

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-17-83

WESTERN AVE STATION

Sheet 9 of 12 Estm DDL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CONCRETE

FORM E240R HOECKEL'S 336461

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT

COLUMN TAKE OFF 34 EA

FROM DWG - GP-A16 COLUMNS SEEM TO BE 18" TO 24" MAX.

30 COLUMNS 32.75 = 982.5 FT } TOTAL 1046 FT.
4 COLUMNS 16' = 64 FT }

SAY 24" THEN:

$1046 \times \frac{2 \times 2\pi}{4} = 3286 / 27 = 122$ C.Y.

OMSM HAS 343 C.Y.

$1046 \times \frac{X \times X}{4} \pi = 9261$ CF.

$X^2 = 4 \times 9261 / 1046\pi = 11.27$

$\sqrt{11.27} = 40$" COLUMNS

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Sheet 10 of 12 Estm DDL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

JOB SCRTD DATE 3-17-83 Spec. Ref. Take-off Quantity

Item Desc. CONCRETE

WESTERN AVE STA PER-OH FOG

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
COLUMN SPREAD 10 CY / COLUMN.													
MOST COLUMNS 33 FT - REQUIRE WINDOWS & SAFEWAY SCAFFOLDING - TOP OUT IN PLATFORM SUSPENDED FROM DECK.													
STEEL FORMS 4 EACH - REUSE FOR TOTAL. WHY NOT SPRING FORM - TWO-LIFT & BUSH HAMMER													
4 COLS SET UP PLACE IN DAY													
40 C.Y. 42 CY TOTAL.													
TOP-													
FOREMAN	10 HR	35.00						35.00					350 -
STINGER CRANE	10	63.00		19.50		14.10		96.60					960 -
HOOKMAN	10	28.00		2.70		3.20		5.90					60 -
P.U	10												
PIER - COL.													
FOREMAN	(ABOVE)												
VIBRATOR	10 HR	29.00		3.70		2.00		35.10					350 +
LABORER	10	28.00											280 -
CARP.	10	30.00											300 +
MISC. SCAFFOLD RENT - CHUTE TRUNK -													100 -
CONCR OVERRUN	2 CY @ 50												100 -
				2500 / 40 =		62.00							2,500 +

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-17-83

WESTERN AVE STATION

Sheet 11 of 12 Estm. DPL Ckd. K ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CONCRETE

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
WALL POUR - PROVIDE 2 WINDOWS PER POUR GET 3 - 50 FT SECTIONS / 9 HR OR 3/HR. PER SECTION.													
SCAFFOLD & WINDOW -													
TOP OUT FROM DECK													
120 FT x 34 FT x 1.25 / 27 = 189 CY NEAT													
EACH SECTION 63 CY + 3 CY OVERRUN													
66 CY IN 3 HRS													
2 CY / SWING WOULD REQUIRE 11 / HR													
11/2 6.5 - HALF FROM DECK @ 4 MIN CYCLE (COULD GO DIRECT BY CHUTE).													
9 HRS - TO GET 200 CY. - 5.5 MIN CYCLE													
4 @ TMP 7 MIN @ WINDOW OR													

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-17-83

WESTERN AVE. STATION

Sheet 12 of 12 Estm DDL Ckd ← ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CONCRETE

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
WALL SPREAD. MUST PERMIT MIDWAY JOINTS OR WINDOW THE POURS. ASSUME NO JOINT & WINDOW. SCAFFOLD REQD.													
DECK CREW													
FOREMAN	10 Hr								35 00				350
CRANE	10								149 50				1495
OPER	10								33 00				330
OILER	10								30 00				300
HOOKMAN	10								28 00				280
P.U.	10								5 90				60
WINDOW CREW	10												
FOREMAN	10 Hr								35 00				350
VIBRATORS	20								35 00				700
LABORERS	30								28 00				840
CARPENTER	10								30 00				300
SCAFFOLD CLOSE													100
OVERRUN CONC.	10 CY	50											500
									5605/189 = 29.66				5605

STATION SHELL CONSTRUCTION - MUCK REMOVAL

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD WESTERN DATE 3-15-83

Sheet 1 of 2 Estm DDL Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity 93,000 CY

Item Desc. EXCESS MUCK REMOVAL

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
EXCESS MUCK - OFF SITE DISPOSAL.													
GEAR OPERATION TO EXCAVATION @ 144 CY/HR.													
TRUCK HAULS 18 C.Y. OR 20 CY WITH SWELL FACTOR.													
CYCLE PER TRUCK 90 MIN = 1½ HOURS - AT OFF PEAK HAULING - WILL GET 4 TO 5 TRIPS/DAY - SAY 5													
AT 12 CY/HR TO GET $\frac{150 \text{ CY/HR}}{12}$ = 13 TRUCKS (½ STANDBY)													
AT 5 TRIPS/DAY/TRUCK IN ONE DAY SPREAD WILL HAUL													
5 X 18 C.Y. X 13 TRUCKS = 1170 CY/DAY = 146/HR OK													
∴ 13 TRUCKS RENTED FOR 93,000 CY AT 12 CY PER TRUCK HOUR = 7750 TRUCK HRS.													
SAY 170 TRUCK HRS = ONE TRUCK MONTH ∴ 7750/170 = 46 TRUCK MONTHS													
46/13 = 4 - TRUCK MOS = EXCAVATION SPREAD.													

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-15-83

WESTERN

Sheet 2 of 2 Estm DOL Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity 93,000 CY

Item Desc.

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
EXCESS MUCK - OFF SITE DISPOSAL													
SPREAD													
FOREMAN (EXCAVATION SPREAD FOREMAN OK)													
FRONT END LOADER													
TRUCK RENTAL													
13 EA @ 4 MO	13 EA @ 3600 @ 4 MO. =										$187,200		
				(RENT)									
OPERATION COSTS													
TRUCKS	7750 HRS		28.00	—			20.00				48.00		372,000
LOADER	600 HRS		30.00		24.50		21.80				76.30		45,780
DUMP MAN	600 HRS		26.00		—		—				26.00		15,600
	620,580 / 93,000 =						$6.67						
	CY										$620,580		
						DM/SM							
$620,580 →							$521,900						

(NOTE: POSSIBLE CREDIT - IF SELL MUCK)

STATION SHELL CONSTRUCTION - DEMOLITION

SUMMARY

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-18-83

WESTERN AVE STATION

Sheet 0 of Estm DL Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DEMOLITION

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
AC PAVING	(SHEET #1)				- OK - IF AC ONLY -								# 7200 ✓
CONCRETE SLABS	(SHEET #1)												3512 ✓
CONCRETE CURBS	(SHEET #2)												1256 ✓
TRAFFIC/STREET LIGHTS	(SHEET #2)				TRAFFIC MUST BE MAIN.								11000 ✓
MANHOLES	(SHEET #3)												8218 ✓
SIGNS	(SHEET #4)												250 - ✓
PARKING METERS	(SHEET #4)												950 - ✓
FIRE HYDRANTS	(SHEET #4)												1500 - ✓
MASONRY BLDG	(SHEET #5)												48,570 ✓
CANOPY	(SHEET #6)												36,400 ✓
HAUL AWAY	(SHEET #6)					✓							25580 ✓
	OMVM		# 150,000		(AGREE)				KC =				$ 144,436

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTO DATE 3-18-83

WESTERN AVE STATION

Sheet 1 of 6 Estm DDL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DEMOLITION -

DEP. ON FOG

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
A C PAVING -	51,260 □' ✓												
CONCRETE SLABS / PAVING.	2000 □'												
SPREAD													
FOREMAN	16 HR			32 00						32 00			512 -
COMPRESSOR 600	16 HR			30 00		12 50		14 50		57 00			912 -
AIR (2 BREAKERS)	32 HR			28 00		5 50		0 50		34 00			1088 -
LOADER	8 HR			30 -		32 00		6 00		68 00			544 -
TRUCK	8 HR.			28 -		12 50		17 00		57 50			456 - OK
													# 3512 ✓

NOTE: FREQUENTLY THE A.C. IS MERELY AN OVERLAY WITH SOME 8 TO 12 INCHES OF CONCRETE BENEATH.

IF ASPHALT ONLY - CAN BE RIPPED UP & HAULED OFF AS PRICED.

51,260 □' @ .15 = # 7200 OK

PROBABLY USE RIG MOUNTED - HOWEVER IF IN TIGHT AREAS USE HAND HELD BREAKERS (2) + 600 CFM COMP. LOAD OUT - STOCKPILE FOR OFF SITE REMOVAL.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-18-83

WESTERN AVE STATION

Sheet 2 of 6 Estm DRL Ckd V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DEMOLITION -

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
CONCRETE CURBS -													
SAME SPREAD AS CONCRETE SLABS - LOADER / TRUCK WILL PICK UP IN SAME SHIFT / OPERATION AS CONC SLAB.													
FOREMAN	8 HR.								32 00				256 00
COMPRESSOR	8 HR.								57 00				456 00
AIR (2 - BREAKERS)	16 HR								34 00				544 00
LOADER } IN CONCR. SLAB REMOVAL													
TRUCK }													# 1256
TRAFFIC LIGHTS / STREET LIGHTS													
OPERATION PERFORMED BY CITY / POWER COMPANY -													
NOTE: TRAFFIC MUST BE MAINTAINED WITH SOME PROVISIONS IN TRAFFIC CONTROL -													
FOR SHEAR REMOVAL									# 500 EA				OK
	22 EA @ 500 00 =												# 11,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB 5CRTD DATE 3-18-83

WESTERN AVE STATION

Sheet 3 of 6 Estm DAL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DEMOLITION

DEP-OH FOG.

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
MANHOLES:													
ASSUME THE STANDARD PRECAST TYPE STRUCTURE. THE MANHOLES WILL BE EXPOSED BY THE TWO TOP LEVEL EXCAVATION OPERATIONS. THE CONCRETE CURB AND SLAB OPERATION TYPE CREW CAN DEMOLISH IN SECTIONS & THE STINGER CRANE LIFT OUT & HAUL TO OFF SITE DISPOSAL SUREE PILE.													
DEMO 6-7 PER DAY — ALLOW 1-WEEK													
FOREMAN	40 HR	32.00						32.00					1280.00
COMPRESSOR	40 HR	30.00		12.50		14.50		57.00					2280.00
AIR (2-BREAKERS)	80 HR	28.00		5.50		.50		34.00					2720.00
STINGER CRANE	16 HR	30.00		19.50		14.00		63.50					1018.00
TRUCK	16 HRS	28.00		12.50		17.00		57.50					920.00
													8218.00 ✓

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-18-83

WESTERN AVE. STATION.

Sheet 4 of 6 Estm DDL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DEMOLITION

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
SIGNS — ASSUME SMALL SUCH AS STREET SIGNS													# 150 LS
PARKING METERS — ASSUME REMOVAL & HAUL TO STORAGE BY CITY													
PAVING BREAKER CREW CAN GAO OUT													# 950 LS
FIRE HYDRANTS — REMOVAL BY CITY FIRE DEPT. DISCONNECT & HAUL TO STORAGE.													
NOTE: THESE WILL PROBABLY BE REQUIRED TO REMAIN IN OPERATION AND THEREFORE BE A UTILITY RELOCATION ITEM													
FOR REMOVAL ONLY - SHOULD BE OK - SAY ONE DAY FOR OPERATION - $1500 LS													# 1500

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-18-83

WESTERN AVE STATION

Sheet 5 of 6 Estm DDL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DEMOLITION

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
MASONRY BUILDING. FROM DWG IT APPEARS THAT THRIFTY DRUG STORE IS TO BE DEMOLISHED. ESTIMATE 150 X 150 SINGLE LEVEL BLDG - TOTAL CLEAN UP 2 - WKS. TRUCKS ON MID 1ST WEEK.													
DEMO SPRED.													
3 MAN CREW													
FOREMAN	80 HR	35.00						35.00					2800 ✓
CRANE (HEAD ACCHE)	80 HR	91.00		72.00		38.00		201.					16080 ✓
DOZER / LOADER	80 HR	30		44.00		31.00		105.					8400 ✓
TRUCK - DEMO BIN (2)	120 HR	28		15.00		18.00		61.					7320 ✓
LABOR - DUST MAN	80 HR	26.00						26.					2080 ✓
LABORERS (2)	160 HR	26.00						26.					4160 ✓
PICK UP.	80 Hr.			2.70		3.20		5.90					470 ✓
DUST WATER - FIRE HYDR. HOOK UP													500 ✓
ADD A 600 CFM COMP. & PAVE BREAKER FOR SECONDARY BREAK UP.													
COMPR.	80	30.00		9.50		11.00		50.50					4040 ✓
AIR HAMMER	80	28.00		5.50		5.00		34.00					2720 ✓
													$48,570 ✓

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB 5 CRTD. DATE 3-18-83

WESTERN AVE STATION

Sheet 6 of 6 Estm DAL Ckd K ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DEMOLITION

FORM E240R HOECKEL'S 335481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
CANOPY - PROBABLY THE MARQUIS IN FRONT OF THE WILTERN THEATER													
NOTE: STORED OR REPLACED ?													
DMJM SOUNDS ADEQUATE													# 36400
HAUL AWAY	3835 C.Y.												
FROM EXCESS MUCK REMOVAL WORK SHEET.													
	3835		# @ 6.67										# 25,580

STATION SHELL CONSTRUCTION - DEPTH REDUCTION

SUMMARY

KELLOGG CORPORATION
DIRECT COST ESTIMATE

JOB SCRTD DATE 3-30-83

Sheet 0 of Estm DDL Ckd ✓ ITEM
Plan Sheet No. Bid Quantity
Spec. Ref. Take-off Quantity
Item Desc. DEPTH REDUCTION

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
DEPTH REDUCTIONS:													

DEPTH REDUCTIONS WERE TAKEN AT THE FOLLOWING STATIONS:

OMSM PB00 - REDUCTIONS

#(2)	1ST & HILL	8' @ #460,000		#3,680,000
(3)	5TH & HILL	7' @ 460,000		3,220,000
(5)	ALVARADO	6' @ 460,000		2,760,000
(6)	VERMONT	2' @ 460,000		920,000
(7)	NORMANDIE	8 @ 460,000		3,680,000
		31 FT.		

OMSM PB00 TOTAL REDUCTION SAVINGS: # 14,260,000
(INCL. MARK-UPS)

KC. DIRECT

SHEET 2	91,000
3	145,000
	# 236,000 / FT.

#460,000 ÷ 1.155 = 398,268 w/o MARKUPS (SAY #400,000 K)

VARIANCE = (400,000 - 236,000) x 31 FEET = # 5,084,000 (ADD)

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB 5CRTD DATE 3-30-83

Sheet 1 of 3 Estm RLL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DEPTH REDUCTIONS

FORM E240E HOECKEL'S 947660

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
DEPTH REDUCTIONS:													

ITEMS THAT VARY WITH DEPTH REDUCTIONS:

DIRECT:

EXCAVATION	C.Y.
STRUCTURAL STEEL	□'
LAGGING	MBM
BACKFILL	C.Y.
MUCK DISPOSAL	

EXCAVATION WILL BE AFFECTED SAME IN MASS EXCAVATION AS THE TOP EX (AROUND UTILITIES) IS SAME IN ALL CASES.

STR. STEEL - FOR THIS SMALL UNIT REDUCTION (3' MAX) SAME PLACING COST. REDUCED #/□'

LAGGING CHANGE: MATERIAL ONLY

BACKFILL QUANTITY AT SAME UNIT COST.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB..... DATE 3-30-83

Sheet 2 of 3 Estm DRL Ckd ← ITEM.....

Plan Sheet No..... Bid Quantity.....

Spec. Ref..... Take-off Quantity.....

Item Desc. DEPTH REDUCTION

FORM E240E HOECKEL'S 347880

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
DEPTH REDUCTION CONTD													
EXCAV PER FOOT	640 x 66.75 / 27 = 1582 C.Y.												
UNIT COST FROM MAN EA. CALC SHEET - 6.45 FOR 30 TON CY													
	6.45 x 1582 = $10,200												
SOLDER PILE LAG:	640 + 640 + 66.75 + 66.75 = 1414 D'												
U.C. FOR ST. SUPP WORK SH.	1414 D' @ SAY 32" = $45,250												
BACKFILL (REDUCE 1 FT AS EXCAV)	1582 CY												
	1582 x 15.75 = $25,000												
MUCK DISPOSAL	1582 C.Y.												
FROM WORK SHEET	1582 @ 6.50 = $10,550												
TOTAL SHEET -											$91,000		

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-30-83

Sheet 3 of 3 Estm DDL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DEPTH REDUCTION

FORM E240E HOECKEL'S 347960

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
DEPTH REDUCTION: DMSM PBBD DEPTH REDUCTION CALCS SHOW STEEL TO REDUCE IN SIZE LESS THAN .5 PERCENT PER FT.													
LAGGING NO CHANGE:													
#1,500,000 / 65 = CALL												#25 000 / FT	
REDUCE OVERALL WT SAY -7% (GENEROUS)													#100,000
CONCRETE REDUCTION													
FORMS NIL CHANGE CONCR 1% REBAR 1% FINISH - CURE NIL													#35,000
MISC. TO DEWATER - TRAFFIC - SUPPORT - DURATION - SAY													10000
TOTAL SH-													#145,000

STATION SHELL CONSTRUCTION - PARKING STRUCTURE DEDUCTION

SCRTD 1223 3-29-83

DPL

1 2 3 4 5

PARKING DEDUCT.
(DUPLICATED)

BEVERLY	4,108,000
UNIVERSAL	11,042,000
	15,150,000

STATION SHELL CONSTRUCTION - MOBILIZATION DEDUCTION

SCRTD 1223 3-29-83

DDL

MOB. DEDUCT

	STA	
1	UNION	434800
2	1ST	619150
3	5TH	802950
4	7TH	547400
5	ALV	255000
6	VER	318900
7	NOR	476950
8	WEST	416600
9	LB	472800
10	FAIR	983850
11	BEV	328900
12	SM	0
13	SUN	474500
14	H.	469700
15	UNIV	415900
16	NH	476950
		7,524,350

APPENDIX D - STATION ARCHITECTURAL

KC 1223 SCRTO/METRO RAIL — AWJ/GHM

STATION ARCHITECTURAL FINISHES SUMMARY — 3/28/83

		STATION	AREA (TAMS)	UNIT PRICES TAMS	UNIT PRICES KC	ESTIMATE COST TAMS	ESTIMATE COST KC	NET CHANGE
1		UNION	30,144	62.19	65.08	1,874,655	1,961,772	87,117
2		1ST/HILL	39,800	51.94	54.55	2,067,212	2,171,090	103,878
3		5TH/HILL	50,800	51.94	54.55	2,638,552	2,771,140	132,588
4		7TH/FLOWER	36,125	62.19	65.08	2,246,614	2,351,015	104,401
5	*	ALVARADO/WILSHIRE	22,240	73.43	76.32	1,633,083	1,697,357	64,274
6	*	VERMONT/WILSHIRE	27,840	71.17	74.06	1,981,373	2,061,830	80,457
7		NORMANDIE/WILSHIRE	22,950	62.19	65.08	1,427,261	1,493,586	66,325
8		WESTERN/WILSHIRE	23,140	62.19	65.08	1,439,077	1,505,951	66,874
9		LEBREA/WILSHIRE	24,024	62.19	65.08	1,494,053	1,563,482	69,429
10		FAIRFAX/WILSHIRE	61,700	51.94	54.55	3,204,698	3,365,735	161,037
11	*	BEVERLY/WILSHIRE	25,880	71.85	74.74	1,859,478	1,934,271	74,793
12		SANTA MONICA	22,550	62.19	65.08	1,402,385	1,467,554	65,169
13		LEBREA/SUNSET	24,300	62.19	65.08	1,511,217	1,581,444	70,227
14	*	HOLLYWOOD/CAHL	22,650	73.23	76.12	1,658,660	1,724,118	65,458
15	*	UNIVERSAL CITY	25,200	72.11	75.00	1,817,172	1,890,000	72,828
16		No. HOLLYWOOD	25,400	62.19	65.08	1,579,626	1,653,032	73,406
17								
18		TOTALS				29,835,116	31,193,377	1,358,261
19								
20								
21								
22								
23								
24								
25		* UNIT PRICES INCLUDE ADDITIONAL $250,000 FOR						
26		HEADHOUSE COSTS.						
27								
28								
29								
30								
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40								

KC1223 SCRTD/METRO RAIL — AWJ/GHM

COMPARATIVE SUMMARY (WESTERN) — 3/28/83

		ITEM	QUANTITY TAMS	QUANTITY KC	UNIT PRICES TAMS $/UNIT	UNIT PRICES KC $/UNIT	ESTIMATE TAMS ($)	COST KC ($)
1	1.	FLOORING	24,850 SF	27,586 SF	9/SF	7.46/SF	223,650	205,814
2	2.	CMU WALLS	21,220 SF	18,230 SF	4/SF	6.57/SF	84,880	119,771
3	3.	WALL TREATMENT	16,704 "	29,592 SF	8/SF	8.09/SF	133,632	239,400
4	4.	CEILING TREATMENT	28,700 "	38,144 SF	3/SF	1.42/SF	86,100	54,164
5	5.	SIGNS + GRAPHICS	—	—	L.S	LS	200,000	200,000
6	6.	MAPPING	—	—	L.S	LS	50,000	50,000
7	7	ARTWORK	—	—	L.S	LS	150,000	150,000
8	* 8	MODULE EQUIPMENT	—	—	L.S	LS	15,000	10,724
9	9.	HARDWARE	—	—	L.S	LS	156,000	125,784
10	10	GRANITE						
11		PLATFORM EDGE	900 LF	900 LF	35/LF	52	31,500	46,800
12	11	STAIRS - GRANITE	1992 LF	684 FT³	35/LF	75.29/FT³	69,720	51,498
13	12	STAIRS - CONCRETE	—	320 NLF	—	19.32/NLF	—	6,182
14	13	CUSTODIAL ROOM	—	—	L.S.	LS	20,000	20,000
15	14	STAFF ROOM	—	—	L.S	LS	15,000	15,000
16	* 15.	RESTROOMS	—	—	L.S	L.S	15,000	8,108
17	16	ACCOUSTICAL PANEL	22,275 SF	22,275 SF	8.20/SF	8.20/SF	182,655	182,655
18	17	GYPSUM BOARD	3,000	3,000 SF	.50/SF	1.40/SF	1,500	4,200
19	18	PAINTING	3,000 SF	3,000 SF	2/SF	.27/SF	6,000	810
20	19	LANDSCAPE	—	—	—	LS	—	15,000
21								
22		TOTALS					1,439,137	1,505,910
23		NET CHANGE						+66,773
24								
25	*	PLUMBING	FIXTURES INCLUDED IN MECHANICAL COSTS					

ASSUME CORRECT.

TAMS SQUARE FOOTAGE OF 23,140 IS THEREFORE UNIT PRICE;

TAMS 1,439,137 ÷ 23,140 = #62.19/SF

KC 1,505,910 ÷ 23,140 = #65.08/SF

KC 1223 SCRTD / METRO RAIL — AWJ/GHM

COMPARATIVE SUMMARY (5TH + HILL) — 3/28/83

		ITEM	QUANTITY TAMS	QUANTITY KC	UNIT PRICES TAMS $/UNIT	UNIT PRICES KC $/UNIT	ESTIMATE TAMS $	COST KC $
1	1.	FLOORING	54,027 SF	64,818 SF	9/SF	7.46/SF	486,243	483,542
2	2.	CMU WALLS	28,293 SF	24,246 SF	4/SF	6.57/SF	113,172	159,296
3	3.	WALL TREATMENT	25,513 SF	30,721 SF	8/SF	8.09/SF	204,104	248,533
4	4.	CEILING TREATMENT	51,005 SF	94,503 SF	3/SF	1.42/SF	153,015	134,194
5	5.	SIGNS + GRAPHICS	—	—	LS	LS.	300,000	300,000
6	6.	MAPPING	—	—	LS	LS	75,000	75,000
7	7.	ARTWORK	—	—	LS.	LS	200,000	200,000
8	8.	MODULAR EQUIP.	—	—	LS.	L.S	30,000	30,000
9	9.	HARDWARE	—	—	L.S	L S	312,000	312,000
10	10.	GRANITE PLT. EDGE	1800 LF	1800 LF	35/LF	52/LF	63,000	93,600
11	11	STAIRS - GRANITE	5760 LF	2,736 FT³	35/LF	75.29/FT³	201,600	205,993
12	12	STAIRS - CONCRETE	—	640 NLF	—	19.82/NLF	—	12,365
13	13.	CUSTODIAL ROOM	—	—	LS	L.S	30,000	30,000
14	14.	STAFF ROOM	—	—	L.S.	L.S	20,000	20,000
15	* 15.	REST ROOMS	—	—	L.S.	L.S	25,000	16,216
16	16.	ACCOUSTICAL PANEL	50,085 SF	50,085 SF	8.20/SF	8.20/SF	410,697	410,697
17	17	GYPSUM WALLS	6,000 SF	6,000 SF	.50/SF	1.40/SF	3,000	8,400
18	18	PAINTING	6,000 SF	6,000 SF	2/SF	.27/SF	12,000	1,620
19	19	LANDSCAPE	—	—	—	LS	—	30,000 -
20								
21		TOTALS					2,638,831	2,771,456
22		NET CHANGE						+ 132,625

23

24

25 * PLUMBING FIXTURES INCLUDED IN MECHANICAL COSTS

26

27

28 ASSUME TAMS SQUARE FOOTAGE OF 50,800 IS CORRECT,

29 THEREFORE UNIT PRICE IS:

30

31 TAMS 2,638,831 ÷ 50,800 = $51.94/SF

32

33 KC 2,771,456 ÷ 50,800 = $54.55/SF

34

35

36

37

38

39

40

KC 1223 SCRTD/METRO RAIL — AWJ/GHM

HEAD HOUSE COSTS — 3/28/83

	ITEM	QUANTITY (TAMS)	UNIT	UNIT PRICES TAMS	UNIT PRICES KC	ESTIMATE COSTS TAMS	ESTIMATE COSTS KC
1.	CMU WALLS	4,650	SF	4.00	6.57	18,600	30,550
2.	CANOPY	5,500	SF	5.85	5.97	32,175	32,835
3	FENCING	1,200	LF	16.00	16.00	19,200	19,200
4.	WALL TILE	4,650	SF	8.00	8.09	37,200	37,620
5.	FLOORING	8,250	SF	9.00	7.46	74,250	61,545
6.	BENCHES		L.S	—	—	2,000	2,000
7.	LIGHTING	5500	SF	3.00	3.00	16,500	16,500
	TOTALS					199,925	200,250
	NET CHANGE						+325

TAMS REVISED ESTIMATE (12/6/82) shows a 25% increase. Therefore, assuming that is correct:

200,250 x 1.25 = $250,000

FOR STATIONS AT ALVARADO, VERMONT, BEVERLY, HOLLYWOOD, + UNIVERSAL

KC 1223 SCRTD/METRO RAIL 3/28/82

CHECK OF FINISHED AREA VS. GROSS AREA AWJ/GHM

	1	2	3	4	5	6
	STATIONS	TYPE	FINISH SF. (TAMS)	GROSS LENGTH	STATION AREA x WIDTH	= AREA	FACTOR: AFINISH/AGROSS
1	UNION	S/C	30,144	640	67	42,880	.7
2	1ST/HILL	O/U	39,800	631	63	39,753	1.0
3	5TH/HILL	O/U	50,800	631	63	39,753	1.3
4	7TH/FLOWER	S/C	36,125	740	63	46,620	.8
5	ALVARADO/WILSHIRE	S/C	22,240	450	63	28350	.8
6	VERMONT/WILSHIRE	S/C	27,840	567	67	37,989	.7
7	NORMANDIE/WILSHIRE	S/C	22,950	672	65	43,680	.5
8	WESTERN/WILSHIRE	S/C	23,140	660	65	42,900	.5
9	LEBREA/WILSHIRE	S/C	24,024	660	65	42,900	.6
10	FAIRFAX/WILSHIRE	O/U	61,700	935	65	60,775	1.0
11	BEVERLY/WILSHIRE	S/C	25,880	685	63	43,155	.6
12	SANTA MONICA	S/C	22,550	680	65	44,200	.5
13	LEBREA/SUNSET	S/C	24,300	690	65	44,850	.5
14	HOLLYWOOD/CAHUENGA	S/C	22,650	635	65	41,275	.5
15	UNIVERSAL CITY	S/C	25,200	630	65	40950	.6
16	NO. HOLLYWOOD	S/C	25,400	672	65	43,680	.6
17							
18							
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KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB KC1223 DATE 3/23/83

Sheet 1 of 3 Estm GHM Ckd. ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. WESTERN STATION UNIT COSTS

PCE. 2-62-2500 HOECKELS 344125

1. QUARRY TILE

ASSUME LIGHT SANDBLASTING AND CLEANING CONCRETE PERFORMED BY STATION SHELL WORK.

6"x6"x 1/2" MUD SET	4.55/SF
EPOXY GROUT + MORTAR	2.03 "
COLORS	.15 "
ABRASIVE SURFACE	.41
WAX COATING	.32
TOTAL	7.46/SF

2. CONCRETE MASONRY UNIT WALLS

DUE TO EARTHQUAKE ZONE, ASSUMED SOLID, REINFORCED

8" THICK - - - #6.57/SF

3. WALL TREATMENT

TILE 4 1/2" x 4 1/2" MUD SET	5.78
EPOXY GROUT	.93
PORTLAND CEMENT MORTAR	1.38
TOTAL	8.09/SF

4. CEILING TREATMENT

MINERAL FIBER	1.26
CEILING PRIMER	.06
CEILING CEMENT	.10
TOTAL	1.42

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB KC 1223 DATE 3/23/83

DCE. 2-82-2500 HOECKELS 844125

Sheet 2 of 3 Estm GHM Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. WESTERN STATION UNIT COSTS

5.	SIGNS + GRAPHICS	L.S.	#200,000
6.	MAPPING	L.S.	#50,000
7.	ARTWORK	L.S.	#150,000
8.	MODULE EQUIPMENT		
	A. BENCHES	#542	ea
	B. FIRE EXTINQUISHERS	#342	ea
	C. EYE WASH	#320	ea
	D. WATER FOUNTAIN	#918	ea
9	HARDWARE		
	A. 5'x5' ALUMINIUM DBLE LEAF	#1311	ea
	B. 4'x4' ALUMINIUM DBLE LEAF	#926	ea
	C. SECURITY GATES ROLL-UP (12x12) MOTORIZED	#2706	ea
	D. METAL RAILINGS	#200	/ LF
	E. SECURITY GATE	#500	ea.
	F. GRATES	#25	/SF

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB KC 1223 DATE 3/23/83

DCE. 2-82-2500 HOECKELS 344125

Sheet 3 of 3 Estm GHM Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. WESTERN STATION UNIT COSTS

10. GRANITE PLATFORM EDGE 1.5 SF/LF ⇒ #34.65/SF x 1.5 SF/LF = #52/LF

11. STAIRS A. GRANITE #75.29/CF
B. CONCRETE #19.32/NLF

12. CUSTODIAL ROOM L.S. #20,000

13. STAFF ROOM L.S #15,000

14. TOILETS

A. WOMEN

PARTITIONS SS FLOOR MOUNTED		#.692 ea
SINKS		366 ea
WATER CLOSETS		619 ea
ACCESSORIES	L.S.	732 ea

B MEN

SAME EXCEPT FOR

ACCESSORIES	456 ea
URINALS	517 ea

15. ACCOUSTICAL PANELS TAMS ESTIMATE REASONABLE #8.20/SF

16. GYPSUM WALL BOARD (INCLUDES FURRING)(FINISHED) #1.40/SF

17. PAINTING PRIMER + 2 COATS .27/SF

18 LANDSCAPING ASSUME L.S. #15,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB KC 1223 DATE 3/22/83

Sheet 1 of 6 Estm GHM Ckd ITEM

Plan Sheet No. GP-A16 Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. WESTERN STATION

DCE. 2-82-2500 HOECKELS 344125

1. QUARRY TILE

A. PLATFORM -	450' x 32'	=	14,400 ♦	TAMS: 14,400 ♦
B. 1. MEZZANINE	140' x 55'	=	7,700 ♦	
2. ENTRANCES #1	18' x 180'	=	3,240	
3. ENTRANCES #2	28' x 38'	=	1,064 ♦	TAMS: 10,450 ♦
	18' x 45'	=	810	
4. SUBTOTAL			12,814	
C. BATHROOMS	25' x 15	=	375 ♦	
D. TOTAL			27,589 ♦	TAMS: 24,850 ♦

QUANTITY CALCULATIONS ABOVE ASSUMED THAT ALL PUBLIC AREAS HAD QUARRY TILE, INCLUDING BATHROOM AND BOTH ENTRANCES. ALL ANCILLIARY AREAS ASSUMED TO HAVE CONCRETE FINISHED FLOORING

2 CONCRETE MASONRY WALLS

A PLATFORM			
1. EAST END	25' x 12'6"	=	313 ♦
	155' x 16'-4"	=	2,532
SUBTOTAL			2,845 ♦

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB..... DATE.....

DCE. 2.82.2500 HOECKELS 344125

Sheet 2 of 6 Estm. GHM Ckd. ITEM.....

Plan Sheet No. GP-A16 Bid Quantity.....

Spec. Ref..... Take-off Quantity.....

Item Desc. WESTERN STATION

2. CONCRETE MASONRY WALLS

A PLATFORM (CONT.) 2845 ℗

2. WEST END 2845 ℗

B. MEZZANINE

1. EAST END 16'6" x 550 = 9,075

2 WEST END 16'6" x 210 = 3,465

C. TOTAL 18,230 IAMS: 21,220 ℗

ASSUMED ALL PARTITION WALLS ARE C.M.U.

3. WALL TREATMENT

A. PLATFORM (SIDES) 2(450) x 12'-6" = 11,250

(ENDS) 2(25) x 12'-6" = 625

B. MEZZANINE (SIDES) 2(165) x 16'-6" = 5,445

SHORT SIDES OF MEZZANINE 4(40)x5 = 800

SIDES OF ESCALATOR 2(90) x 5 = 900

BATHROOMS + END WALLS 2 x 27 x 16 + 2 x 16 x 56 = 2,656

C. ENTRANCE #1 2(180) x 16 = 5,760

ENTRANCE #2 2(83) x 16 = 2,656

D. TOTAL 29,592 DMJM 16,704

ASSUMED THAT TILE WALLS CONTINUOUS FROM ENTRANCE THRU STATION. TREATED WALL @ TRACTION POWER SUBSTATION AS VERTICAL WALL. BATHROOMS WERE ALSO CONSIDERED AS TILE WALLS.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB KC 1223 DATE

Sheet 3 of 6 Estm GHM Ckd ITEM

Plan Sheet No. GP-A16 Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. WESTERN STATION

DCE. 2-62-2500 HOECKELS 344125

4. CEILING TREATMENT

PLATFORM	310' x 56' =	17,360
MEZZANINE	300' x 56' + 400 ☐ =	16,800 + 400 = 17,200 ☐
ENTRANCES	140' x 18' + 28' x 38' =	2520 + 1,064 = 3,584
TOTAL	38,144'	TAMS: 14,400

CEILING TREATMENT ASSUMED THRU OUT PUBLIC AREAS.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB KC1223 DATE 3/22/83

DCE. 2-82-2500 HOECKELS 344125

Sheet 4 of 6 Estm Ckd ITEM

Plan Sheet No. GP-A16 Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. WESTERN STATION

5. SIGNAGE + GRAPHICS — LUMP SUM — $200,000
THE TAMS FIGURE OF $200,000 SEEMS ADEQUATE

6. MAPPING — LUMP SUM — $50,000
THE TAMS FIGURE OF $50,000 SEEMS ADEQUATE.

7. ARTWORK — LUMP SUM — $150,000
THE TAMS FIGURE OF $150,000 SEEMS ADEQUATE.

8. MODULE EQUIPMENT
A. BENCHES
INFERRED FROM PLAN 16 BENCHES
B. FIRE EXTINQUISHERS
6 1 1/2" STANDPIPES (UBC)
C. EYE WASH
1
D. WATER FOUNTAIN
2 HANDICAPPED ACCESSIBLE

KELLOGG CORPORATION
DIRECT COST ESTIMATE
Item Analysis

JOB KC 1223 DATE 3/23/83

Sheet 5 of 6 Estm. GHM Ckd. ITEM
Plan Sheet No. GP-A16 Bid Quantity
Spec. Ref. Take-off Quantity
Item Desc. WESTERN STATION TAKE-OFF

DCE. 2-82-2500 HOECKELS 344125

9. HARDWARE
A. DOORS
1. ALUMINIUM DOUBLE LEAF 5'x5' : ASSUME TAMS TAKE-OFF OF 6 CORRECT
2. ALUMINIUM DOUBLE LEAF 4'x4' ; ASSUME TAMS TAKE-OFF OF 19 CORRECT
B. SECURITY GATES (ROLL DOWN) - ASSUME TAMS TAKE-OFF OF 4 CORRECT
C. STAIR RAILING - 150' LF - TAMS: 150 LF
D. GATES TO END OF PLATFORM 4 TAMS: 4
E. GRATES 300 SF - ASSUME TAMS TAKE-OFF CORRECT
F. MISCELLANEOUS ORNAMENTAL METALS. LUMP SUM #50,000 LACK OF DETAILED DESIGN; HAVE TO ASSUME TAMS TAKE-OFF CORRECT

10. GRANITE PLATFORM EDGE 450 x 2 = 900 LF TAMS: 900LF
11. STAIRS
A. GRANITE: ENTRANCES (2) : $2 \times 35 \times 6' \times 1^2 = 420\ ft^3$
TO PLATFORM $2 \times 22 \times 1^2 \times 6' = 264\ ft^3$
B. CONCRETE: EMERGENCY STAIRS
$2 \times 20 \times 8 = 320$ NOSE LF.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB KC 1223 DATE 3/03/83

Sheet 6 of 6 Estm Ckd ITEM

Plan Sheet No. GP-A16 Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. WESTERN STATION TAKE-OFF

DCE. 2-82-2500 HOECKELS 344125

12. CUSTODIAL ROOM - ASSUME TAMS ESTIMATE OF $20,000 CORRECT, IF NOT HIGH

13. STAFF ROOM - ASSUME TAMS ESTIMATE OF $15,000 CORRECT, IF NOT HIGH

14. TOILETS

A. WOMENS

PARTITIONS	6
SINK	3
WATER CLOSET	6
ACCESSORIES	

SEEMS REASONABLE

B. MEN (SAME AS WOMEN EXCEPT 2 URINALS IN PLACE OF 2 W.C.

15 ACCOUSTICAL PANELS ASSUME TAMS ESTIMATE OF 22,275 ℓ CORRECT

16. GYPSUM BOARD 3,000 ℓ ASSUME TAMS ESTIMATE CORRECT

17. PAINTING 3,000 ℓ ASSUME TAMS ESTIMATE CORRECT

18 LANDSCAPING LS $15,000 SEEMS REASONABLE FOR URBAN SETTING

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB KC 1223 - ARCHITECTURAL FINISHES DATE 3/23/83

DCE. 2-82-2500 HOECKELS 344125

Sheet 1 of 2 Estm GAHM Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. 5TH + HILL - QUANTITIES

1. FLOORING

ASSUME TAMS ESTIMATE CORRECT EXCEPT ADD 4 ENTRANCES + BATHROOMS.

TAMS :	54,027	
BATHROOM:	WESTERN x 1.5	= 563
(4) ENTRANCES:	(2) x WESTERN	= 10,228
TOTAL		= 64,818 SF

2. CMU WALLS

1.33 x WESTERN

1.33 x 18,230 = 24,246 SF

3. WALL TREATMENT

WESTERN + LOWER PLATFORM ENDS

29,592 + 1129 = 30,721 SF

4 CEILING TREATMENT

TAMS USED WESTERN + LOWER PLATFORM AS SQUARE FOOTAGE. KC DOES NOT AGREE.

LOWER PLATFORM	460 x 58'-6"	= 26,325 SF
UPPER PLATFORM	340 x 58'-6"	= 19,890
MEZZANINE	700 x 58'-6"	= 40,950
2x WESTERN ENTRANCES	2 x 3,584	= 7,168
TOTAL		94,503

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB KC-1223 ARCHITECTURAL FINISH. DATE 3/29/83

Sheet 2 of 2 Estm GHM Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. 5TH + HILL - QUANTITIES

PCE. 2-82-2500 HOECKELS 344125

5. SIGN + GRAPHICS $300,000 L.S. SEEMS REASONABLE
6. MAPPING $75,000 L.S " "
7. ARTWORK $200,000 L.S. " "
8. MODULAR EQUIPMENT
$30,000 L.S. " "
9. HARDWARE $312,000 L.S. " "
10 GRANITE PLATFORM EDGE
4 x 450 = 1,800 LF
11. STAIRS
A. GRANITE 4 x WESTERN
4 x 684 FT³ = 2,736
B. CONCRETE 2 x WESTERN
2 x 320 NLF = 640 NLF
12. CUSTODIAL ROOM $30,000 L.S. SEEMS HIGH
13. STAFF ROOM $20,000 LS " "
14. RESTROOM 2 x WESTERN L.S.
2 x $8,108 = 16,216 L.S.
15. ACCOUSTICAL PANELS
ACCEPT TAMS 50,085 SF
16. Gypsum WALL BOARD
ACCEPT TAMS 6,000 SF
17. PAINTING
ACCEPT TAMS 6,000 SF
18. LANDSCAPING
NOT PRESENT IN TAMS $30,000 L.S.

APPENDIX E - STATIONS-MECHANICAL AND ELECTRICAL

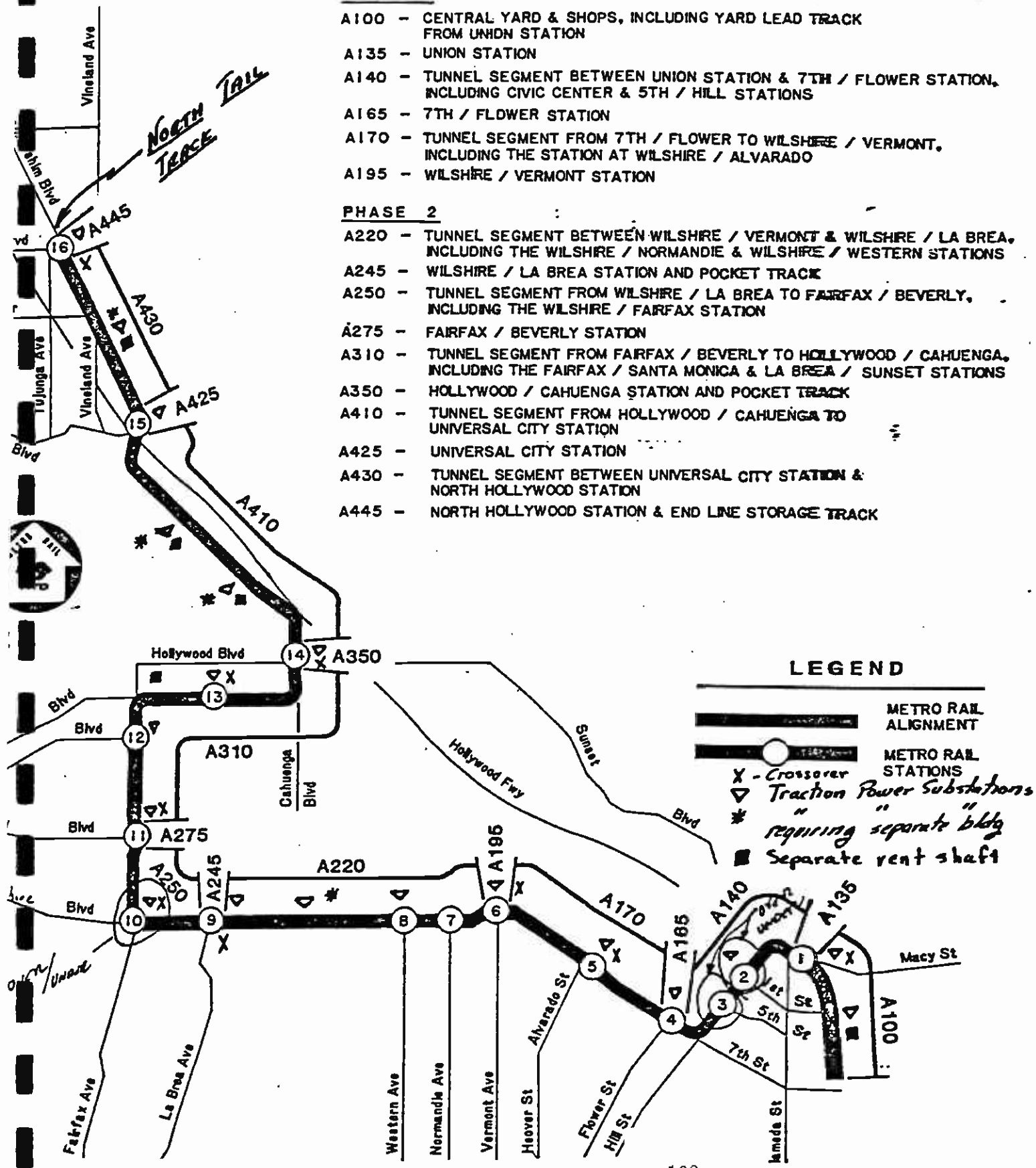
Southern California Rapid Transit District
Metro Rail Project
DESIGN UNITS

PHASE 1

- A100 – CENTRAL YARD & SHOPS, INCLUDING YARD LEAD TRACK FROM UNION STATION
- A135 – UNION STATION
- A140 – TUNNEL SEGMENT BETWEEN UNION STATION & 7TH / FLOWER STATION, INCLUDING CIVIC CENTER & 5TH / HILL STATIONS
- A165 – 7TH / FLOWER STATION
- A170 – TUNNEL SEGMENT FROM 7TH / FLOWER TO WILSHIRE / VERMONT, INCLUDING THE STATION AT WILSHIRE / ALVARADO
- A195 – WILSHIRE / VERMONT STATION

PHASE 2

- A220 – TUNNEL SEGMENT BETWEEN WILSHIRE / VERMONT & WILSHIRE / LA BREA, INCLUDING THE WILSHIRE / NORMANDIE & WILSHIRE / WESTERN STATIONS
- A245 – WILSHIRE / LA BREA STATION AND POCKET TRACK
- A250 – TUNNEL SEGMENT FROM WILSHIRE / LA BREA TO FAIRFAX / BEVERLY, INCLUDING THE WILSHIRE / FAIRFAX STATION
- A275 – FAIRFAX / BEVERLY STATION
- A310 – TUNNEL SEGMENT FROM FAIRFAX / BEVERLY TO HOLLYWOOD / CAHUENGA, INCLUDING THE FAIRFAX / SANTA MONICA & LA BREA / SUNSET STATIONS
- A350 – HOLLYWOOD / CAHUENGA STATION AND POCKET TRACK
- A410 – TUNNEL SEGMENT FROM HOLLYWOOD / CAHUENGA TO UNIVERSAL CITY STATION
- A425 – UNIVERSAL CITY STATION
- A430 – TUNNEL SEGMENT BETWEEN UNIVERSAL CITY STATION & NORTH HOLLYWOOD STATION
- A445 – NORTH HOLLYWOOD STATION & END LINE STORAGE TRACK



APPENDIX F - CROSSOVERS, POCKET TRACKS AND TAIL TRACK

SUMMARY

KELLOGG CORPORATION
DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-82

Sheet 0 of Estm DAE Ckd K ITEM
Plan Sheet No. Bid Quantity
Spec. Ref. Take-off Quantity
Item Desc. CROSS OVER

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
CROSS OVER													
SOLDIER / LAG -													1,575,000
STREET DECK													354,000
S O G													799,000
ROOF DECK													578,000
PART PART WALLS													267,000
EXTERIOR WALLS													774,000
DEWATERING													ELSEWHERE
EXCAVATION													430,000
COMP. BACKFILL													315,000
EXCESS MUCK DISPOSAL													301,000
													5,393,000

5,393,000 / 460 = #11,723 / FT

DMWM #11,000 — CLOSE — BUT THERE'S NO MARK UPS.

ALLOWING FOR MISC? SITE RESTORATION ETC. USE #12,000

AT FAIRFAX USE #14,000 / LF (DUE TO DEPTH)

SUMMARY CONTD

KELLOGG CORPORATION
DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-83

Sheet 0 of 02 Estm DOL Ckd ✓ ITEM
Plan Sheet No. Bid Quantity
Spec. Ref. Take-off Quantity
Item Desc. CROSS OVER

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
CROSS OVER CONTD													
KC EST (ALL X-OVERS EXCEPT FAIRFAX)													
							2760 x 12000 =				33,120,000		
KC EST (FAIRFAX)							460 x 14000 =				6,440,000		
											39,560,000		
ONJM-PBOD EST:													
	3320 x 11,000 (LESS INDIRECTS)												
	SAY 9600 DIRECT												
	∴ 3320 x 9600 =										31,872,000		
	CALL 7,700,000										7,688,000		

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-83

Sheet 1 of 5 Estm ODL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CROSSOVERS

FORM E240E HOECKEL'S 347880

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
CROSSOVERS													

LOCATED IN ESTIMATE & ON THE SCHEMATIC DIAGRAM TO BE IN REACHES 2 - 5 (2 EA) - 8 (2 EA) - 10 - 14

TOTAL 7 CROSSOVERS @ 460' EA = 3220'

CUTS:

REACH	STATION	- CUT -
2	UNION	35'
5	ALVARADO	?
5	VERMONT	46
8	FAIRFAX	84
8	BEVERLY	42
10	LA BREA - SUNSET	55
14	NO HOLLYWOOD	64

SPECIAL

AVE CALC 50'

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-83

Sheet 2 of 5 Estm DR Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CROSS OVERS

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
CROSSOVERS	CONT'D												

STRUCTURE CONSISTS OF:

- ✓ SOLDIER PILE & LAGGING
- ✓ STREET DECKING
- ✓ SLAB ON GRADE
- ✓ ROOF DECK.
- ✓ PARTIAL PART WALLS
- ✓ EXTERIOR WALLS.
- X DEWATERING.
- ✓ EXCAVATION MACH/HAND.
- COMP. BACKFILL
- EXCESS MUCK DISPOSAL.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-83

Sheet 3 of 5 Estm DDL Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CROSS OVER

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
CROSSOVER CONT'D													
SOLD PILE LAG	(65 + 65 + 460 + 460) 50 = 52,500 □'												
@	52500 □'							30.00					1,575,000
STREET DECKING	65 x 460 = 30,000 □'												
	30000 □'							11.80					354,000
EXCAVATION													
TOP 3'	3400 CY							21.00					71400
NEX 5'	5670 CY							10.00					56700
BULK	46500 CY							6.50					302200

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-83

Sheet 4 of 5 Estm OOK Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CROSS OVER

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
CROSS OVER CONT'D													$
SLAB ON GRADE	5500 CY. (OB 5700)								70.00				399 000
REBAR	1000 000 #		TO MUCH CUT [illegible] 200#						38				380 000
FINISH /CURE	LS												20 000
													799 000 ✓
ROOF DECK	3000 CY (3400)								70.00				210,000
REBAR	600 000 #								38				228 000
FORMS	26000 □'								5.00				130 000
FINISH /CURE	LS												10 000
													578 000 ✓
EXTERIOR WALLS	2700 CY (3000)								78.00				234,000
REBAR	540000								38				205000
FORMS	50000 □'								6.50				325 000
FINISH /CURE	LS												10 000
													774,000 ✓
PART PART WALLS	800 (900)								82.00				74000
REBAR	160000								38				61000
FORMS	22000								6.00				132 000
CURE (FORMED)	NIL												267 000 ✓

-204-

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTO DATE 3-24-83

Sheet 5 of 5 Estm. DAA Ckd. K ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. CROSS OVER

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
CROSS OVER CONT'D													
COMPACTED BACKFILL													
	20000 CY										15.75		315,000
EXCESS MUCK DISPOSAL													
	45000 CY										6.70		301,000

SUMMARY

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-23-83

Sheet 0 of Estm DLC Ckd K ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. POCKET TRACK

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
POCKET TRACKS													
KC ESTIMATE			$12,500/FT			DIRECT							
			12500 x 2260 =								$28,250,000		
PRIOR PROD EST.			$11000/FT ALL IN										
CONVERT TO DIRECT													
			9600 x 2260 =								$21,696,000		
CALL			$6,500,000								$6,554,000		

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-23-83

Sheet 1 of 1 Estm DDL Ckd V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. POCKET TRACK

FORM E240E HOECKEL'S 347880

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
POCKET TRACKS	LOCATED IN ESTIMATE 4 ON THE SCHEMATIC DIAGRAM TO BE REACHES 6 & 11 TOTAL 2 @ 1010 & 1250 FT EACH FOR TOTAL OF 2260 FT.												
CUTS:													
REACH 6	STATION LA BREA WILSHIRE 575'												
11	HOLLYWOOD 55												
SLIGHTLY DEEPER THAN CROSS OVER AVERAGE CUTS - USE 12,500* DIRECT COST.													

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTP DATE 3-23-83

Sheet 1 of 1 Estm DPK Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. TAIL TRACK (N. Hollywood)

FORM ER40E HOECKEL'S 947660

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
TAIL TRACK													
LOCATED AT NORTH END OF LINE FROM STATION 1069+50 TO 1057+54 TOTAL CALC 1200 LF.													
CUT:													
ADJACENT TO NORTH HOLLYWOOD STATION WHICH IS 64 FT DEEP													
∴ USE $13000/FT													
13000 @ 1200 =													15,600,000
AS THIS WILL SERVE AS NORTH SHOP AND MAINT AREA - ALLOW FOR ELEC/MECH & SOME SHOP EQUIP													4,400,000
CALC													$20,000,000

SUMMARY

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-30-83

Sheet 0 of Estm DRL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. REACH 1 DUAL TRACK C/C

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
REACH 1 DUAL TRACK													
DUAL TRACK TWIN TUBE C/C	792 FT. @ 45 FT NE CUT								$11000				$8,712,000
DUAL TRACK SINGE C-C.	945 FT @ 30 FT								$7000				$6,615,000
													$15,327,000
REACH 1 DMJM PREP EST					1,155,000								
					8267,000								
					9,422,000								$8158 000
REDUCE TO DIRECT COST					8158 000								$7,169,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-30-83

Sheet 1 of 1 Estm DRL Ckd K ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. REACH 1 QUANTITIES DUAL TRACK.

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
REACH 1 DUAL TRACK:													
K C TAKE OFF	OVERALL STATION LENGTH 640 FT SCHEMATIC SHOWS 450 FT WHICH IS PLATFORM. ∴ 95 FT EACH WAY THEN END OF STATION IS 102+12.42												
	102+12.42 TO THE EL MONTE EXTENSION BULKHEAD (94+20) IS 792.42 CALL 792												
	EL MONTE BULKHEAD TO PORTAL 94+20 → 84+75 = 945 FT.												
DUAL TRACK TWIN TUBE	792 FT WITH AVE 45 FT CUT												
DUAL TRACK C/C	945 FT WITH AVE 30 FT CUT.												

APPENDIX G - LINE VENT STRUCTURES-CITY AND MOUNTAIN

SUMMARY

KELLOGG CORPORATION
DIRECT COST ESTIMATE

JOB SCRTD DATE 3-21-83

Sheet 0 of 01 Estm DRL Ckd K ITEM
Plan Sheet No. Bid Quantity
Spec. Ref. Take-off Quantity
Item Desc. DOWNTOWN VENT STRUCTURE

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
DOWNTOWN VENT STRUCTURES (SOFT GROUND)													
STRUCTURE ONLY - DIRECT COSTS													
KC ESTIMATE TOTALS SH. 1 THRU 4 =													$902,000
DMJM EST													
AS PRESENTED													
DEMO				50 000									
SITE WORK				43 000									
TRAFFIC MAINT.				12 000									
EARTHWORK				98 000									
SHORING				158 000									
CONCRETE				548 000									
WATERPROOF				28 000									
SUBTOTAL				$ 937,000							$		$902,000
UTILITIES				—		ELSEWHERE							
ARCH FINISHES				—		SHOULD BE MINIMAL							
MECH / ELEC				—		ELSEWHERE							
MOB				—		ELSEWHERE							

SUMMARY COPY

KELLOGG CORPORATION
DIRECT COST ESTIMATE

JOB SCRTD DATE 3-21-83

Sheet 0 of 02 Estm DAL Ckd ✓ ITEM
Plan Sheet No. Bid Quantity
Spec. Ref. Take-off Quantity
Item Desc. Downtown Vent Str.

FORM 5240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
DOWNTOWN VENT STRUCTURE CONTD													
STRUCTURE ONLY DIRECT COSTS													
DMJM EST. CORRECTED FOR MAIN.													
DEMO			50 000										
SITE WORK			43000										
TRAFFIC MAINT.			12 000										
EARTHWORK			108 000										
SHORING			626,000										
CONCRETE			514 000										
WATERPROOF			18,000										
			#1,318,000										
KC EST			902 000										
			#416,000										
3 SHAFTS			416 000		× 3 =		1,248		CALL				#1,250,000

NOTE: STR ONLY
LESS ARCH FINISHES
MECH - ELECT.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-21-83

Sheet 1 of 4 Estm DDL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DOWNTOWN VENT SHAFTS

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
LINE VENT SHAFTS: ASSUME 30 FT DEEP TO CROWN OF TUNNELS (AVERAGE) MUST BE DRIFTED TO SIDEWALK OR ADJECENT PARKING LOT AREAS. THIS WILL ALLOW GRATED VENT STRUCTURE. ASSUME ALL OPEN CUT - WILL CREATE A TRAFFIC CONTROL PROBLEM.													
I DEMOLITION	3 SITE CERTAINLY LOCATE 2 OUT OF 3 IN TAKE AREAS REQUIRING MINIMAL DEMO.												
PAVE & CURB REMOV. SAY												ALLOW	15,000
II SITE WORK													
PAVING REPL.	2500 □'	100x15 + STRUCT. AREA @ 2¢											5000
LANDSCAPING & IRR	L.S.	(SHOULD BE MINIMAL TO NIL)											10000
CURB WORK													1000
II TRAFFIC MAINTENANCE - LOCAL ONLY - MAIN TRAFFIC MAINT UNDER THAT SPECIFIC ITEM (FENCE & MISC.)													10,000
												TOTAL SHEET #	41,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-21-83

Sheet 2 of 4 Estm RDL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. DOWNTOWN VENT STACKS

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
III EARTHWORK	AT 30' DEEP x 100' TO ROADSIDE x 40' = 4500 CY @ MOST												
MACH. EXCAV.	4000 CY							5	20000				
HAND EXCAV	200 CY							24	4800				
COM. IMPORT	500 CY	WHY HERE?		ALLOW SOME				15	7500				
DISPOSAL													
DISP. EXCESS	4200 CY							6.50	27300				
IV SHORING -													
SOLDIER/LAG	150000'	(SHALLOW - UNIT DOWN)						20					300,000
		* NOTE: DRUM EXTENSION BUST.											
DECKING	38950'	SPAN WAY DOWN SAY -						8					31,160
DEWATERING	6 Mo	DOWN TO GRADE - NO MORE THAN 6 -											30000
WALKWAY DECK		STRONG BACKED PLYWOOD.											2000
STEEL SHEET (WHERE)				ALLOW									5000
								TOTAL SHEET					428,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-21-83

Sheet 3 of 4 Estm Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. QUANTITY SHEETS -

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
V CONCRETE:													
FORMWORK													
EX. WALLS	4000 □'							6 00					24,000
INTER. WALLS	6000 □'	WHERE SO MANY ?						6 00					36,000
ROOF.	5000 □'	?						7 00					35,000
CONCRETE													
S.O.G.	410 C.Y.							70 00					28,700
EXT. WALLS	450 C.Y.							80 00					36,000
INT. WALLS	118 C.Y.							90 00					10 600
ROOF SLAB	615 CY	MOST BE 5' THICK						80 00					49200
REBAR													
SOG @ 100#	41000 #							0 40					16400
EX WALL @ 200#	90000 #							0 40					36000
INT WALL @ 80#	? 9500 #							0 40					3800
ROOF @ 300#	184500 #							0 35		?			64575
FINISH & CURE	L.S.												5000
						TOTAL	SHEET						345,000

-215-

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-21-83

Sheet 4 of 4 Estm DLL Ckd V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. Downtown Vent Shaft

FORM E240R HOECKEL'S 335481

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	REP. LABOR UNIT	REP. LABOR AMOUNT	MAT'L UNIT	MAT'L AMOUNT	SUB-BID UNIT	SUB-BID AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
VI WATERPROOFING												#	
5/16" BENT. PANELS WALL	6048 □'							1.00					6000
5/ " " ROOF	3520 □'							1.-					5500
WATER STOP JOINT PACK	2560 □'	?						5.00					4000 / 12,000
VII UTILITY SUPPORTS. THIS ITEM DUPLICATED IN # 25,000,000													—
VIII ARCH FINISHES. NO: NOT A PAY AREA - ALLOW SOME PAINT OR BUSH HAMMER OF VENT STR.													10,000
IX MECHANICAL													— o —
X ELECTRICAL												#	50,000
NOTE: STRUCTURE ONLY. ALLOW FOR HOISTING EQUIP.													
TOTAL SHEET												#	88,000

SUMMARY

KELLOGG CORPORATION
DIRECT COST ESTIMATE

JOB SCRID DATE 3-21-83

Sheet 01 of 02 Estm DDL Ckd ~ ITEM
Plan Sheet No. Bid Quantity
Spec. Ref. Take-off Quantity
Item Desc. VENT SHAFT MTN

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
MOUNTAIN VENT SHAFTS				TWO	EACH	IN	MTN	(ROCK)					
											#		
TOTAL SHEETS	1 THRU 5							(KC EST)					3,144,000
OMUM EST		AS PRESENTED											
			#										
SITE WORK				250,000									
EARTHWORK				-0-				(NOT EXTENDED)					
SHORING				100,000									
CONCRETE				1,684,000									
STR. STEEL / IRON				54,100									
SPECIAL HOIST				800,000									
CONSTR VENT SYSTEM				400,600									
FINISHES				11,000									
ELEC-MECH				—				ELSEWHERE					
			#								#		
DIRECT STRUCTURAL			3,299,000								3,299,000		
											# 155,000		
			#										
TWO SHAFTS	155,000 x 2 = CALC						300,000				# 300,000		
						DMUM EXCEEDS KC							

SUMMARY CONTD

KELLOGG CORPORATION
DIRECT COST ESTIMATE

JOB SCRTD DATE 3-21-83

Sheet 02 of 02 Estm DMJM Ckd ITEM
Plan Sheet No. Bid Quantity
Spec. Ref. Take-off Quantity
Item Desc. VENT SHAFT - MTN -

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
MOUNTAIN VENT SHAFT CONTD													
DMJM EST. CORRECTED FOR MATH.													
SITE WORK			250 000										
EARTH WORK			660 000		DMJM EXCLUDED.								
SHORING			100 000										
CONCRETE			1684 000										
STR STEEL			54 000										
SP. MOIST			800 000										
CONSTR VENT			400 000										
FINISHES			11 000										
DMJM —			$ 3,959,000										
KC EST			3144 000										
			$ 815 000	EACH									
TWO SHAFTS			$ 1,630,000	+ MOB					$ 2,000,000				

NOTE DMJM LEFT MOBILIZATION OUT OF THEIR ONE. 400,000 =

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-21-83

Sheet 1 of 5 Estm DDL Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. VENT SHAFT MTN

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
MOONTHIN VENT SHAFTS:						TWO EACH IN MTN							
AREA - SELECT AREA WHERE DAYLIGHT SHOOTING - BLASTING PERMITTED. WORK 7-8s OR 1-10-. MAT THE SHOTS AND ONCE UNDERWAY BLASTING IS OF NIL EFFECT.													
I SITEWORK	L.S.	ROADS - REHAB ETC											150,000
II EARTHWORK:	ASSUME 300 LF @ 24' O.D.												
	$\frac{24^2 \pi}{4} \times \frac{300}{27} = 5000$ CY BLAST												
	ASSUME 3#/CY - POWDER CAPS												
EXCAVATION	(SEE BACK UP SHEETS-X)												920 000
BUILD BASEMENT	3		1620 CY @ 4.00										5000
BACKFILL			540 CY @ 5.00										3000
DRIFT OUT SIDE TUNNELS OVER HEADINGS - 80' @ 500													40 000
													1118 000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-21-83

Sheet 2 of 5 Estm DM Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. VENT SHAFT MTN

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
II EARTHWORK (CONT'D)													
DISP. EXCESS ROCK - DOUBT IF WE CAN LEAVE ANY OF THIS ON TOP. EPA - GET RID OF ALL #													
	6000 CY				@ 10.00								60,000
III SHORING - ASSUME ROCK FAIRLY COMP. - THEN USE 20% RIBS - WITH ROCK BOLT & MINE STRAPS.													
	80,000 #		RIBS - LAG.										50000 OK
			ROCK BOLTS (PERM)										25,000
													# 135,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-21-83

Sheet 3 of 5 Estm DPL Ckd ← ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. VENT STRUCTURE MTN

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
IV CONCRETE													
FORMWORK.													
SLIPFORM	18850 SF	110 × 300				20-11 × 300		10 00					188,000
PART WALL	12000 SF							8 00					96,000
SIDE TUNNELS	2100 SF							6 00					12,000
BUILD. BASE	8000 SF							5 00					40,000
BUILD. PART.	2500 SF							4 -					10,000
SLAB ROOF	1000 SF							8 -					8000
CONCRETE													
SHAFT WALLS	1400 CY	21 FT × 300 × 2' / 27 = 1466						250 00					350,000
SHAFT PART WALL	220 CY							200 00					44,000
SIDE TUNNEL	186 CY	UNDERGROUND						500 -					93,000
SOG	30 CY							100 -					3000
BLDG BASE WALL	300 CY							200 -					60 000
BLDG PART WALL	100							200 -					20 000
ROOF	80							200 -					16 000
													940,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-21-83

Sheet 4 of 5 Estm DDL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. VENT STRUCTURE MTN

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
IV CONCRETE	CONT'D												
REBAR													
SHAFT WALLS	-0-	?											
SHAFT PART WALL	26640 #							0	60				16000
SIDE TUNNEL	-0-		DEL TO SITE										
BLDG WALLS	60000 #		& LOWERING					0	60				36000
BLDG PART.	11000 #		COSTS IN					0	60				6600
ROOF SLAB	11500 #							0	60				7000
S.O.G.	2700 #							0	60				2000
						TOTAL	REBAR						68,000
FINISH/CURE	JOB		L.S.										15,000
								TOTAL	SHEET				$83,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-21-83

Sheet 5 of 5 Estm DDL Ckd V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. VENT STRUCTURE - MTN

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
V STR. STEEL & MISC. IRON -													
ACCESS LADDER W/ LANDINGS	300 LF												38,000
FAN SUPPORT													5000
FAN RM GRATE													14000
VI SPECIAL HOIST HEADGEAR . . .									NOT INCL				800,000
NO DESIGN AVAILABLE - THE OMJM ALLOWANCE WOULD ALLOW A VERY COMPLETE INSTALLATION - PROB 1/2													400 000
VII CONSTRUCT VENT SYSTEM ? THOUGHT THATS WHAT IS ABOVE (OMJM)													400,000
VIII MECHANICAL													~~672,000~~
IX ?													
~~X~~ ELECTRICAL													~~504,000~~
~~XI~~ FINISHES													11 000
NOTE: STRUCTURE ONLY													868 000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTO DATE 3-21-83

Sheet X-1 of ____ Estm DPL Ckd ____ ITEM ____

Plan Sheet No. ____ Bid Quantity ____

Spec. Ref. ____ Take-off Quantity ____

Item Desc. SINK SHAFT - 300' 24 ϕ

FORM E240E HOECKEL'S 347860

DEP EOH FOG

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
EXCAVATE SINK SHAFT	300 LF.			5000 CY BULK TO 7000 C.Y. - INCL. OVER BREAK -									
ON 8 HR SHFT BASIS				UP TO SPEED 2 WK. WITH HALF CREW.									
FOREMAN	2 EA.	34.00								34.00		68.00	
MINERS	5 EA	30.00								30.00		150.00	
AIR TRACKL	3 EA			15.00		6.00				21.00		63.00	
COMPRESSOR	2 EA	28.00		15.50		17.00				60.50		121.00	
C TENDERS	5 EA	26.00		-		-				26.00		130.00	
POWDERMAN	1 EA	32.00		-		-				32.00		32.00	
DOZER - D6 -	1 EA.	30.00		16.75		13.25				60.00		60.00	
CRANE -	1 EA	60.00		95.50		48.00	(½)			179.50		179.50	
DOZE TO SPOCK	1 EA	30.00		16.75		13.25	(½)			53.50		53.50	
LABOR TOP	2 EA	26.00		-		-				26.00		52.00	
DRILL DOCTOR	1 EA	30.00								30.00		50.00	
												#	939.00
UP TO SPEED	80 HK @ 470 =						37600						
SINK SHAFT @ 3'/EA. 100 x 8 x 939 =							751,200						
							# 788,800						

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-21-83

Sheet 1 2 of Estm RRL Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. SINK SHAFT

FORM E249E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
SINK SHAFT (ONE ONLY)									788800				
POWDER PRIMERS - STEEL BITS									45,000				
DEVELOP - POWDER PRIMER DELICATE LA AREA. ESCORTED TRANSPORTATION.									20,000				
TEMP. ROCK BOLTING DURING SINKING									40,000				
MISC.									25000				
									CALL # 920,000				

APPENDIX H - VENT STRUCTURES-MECHANICAL AND ELECTRICAL

DMJM/PBQD

Revised 12/30/82

METRO RAIL PROJECT

TUNNEL VENT SYSTEM

Note: Cost includes 15.5% Mark up - No. Cont.)

JOB No. WBS-14-A1E | SHEET No.

DESIGNED BY | DATE 30 DEC 1982

APPROVED | Cost = $000.000

REACH No.	MECHANICAL (ONLY) O-U station	Single Level station	O.U. Station X-over	S.L. Station X-Over	Line Vent Mech	Line Vent Struct, Arch & Elect.
1		(1) 1.74			(1) 0.57	(1) 2.7
2	(2) 6.94		(1) 0.88			
3		(1) 1.74				
4		(1) 1.74				
5		(2) 3.48		(2) 0.36		
6		(1) 1.74		(1) 0.18		
7		(1) 1.74				
8	(1) 3.47		(1) 0.38	(1) 0.18		
9		(1) 1.74				
10		(2) 3.48		(1) 0.18	(1) 0.57	(1) 2.7
11		(1) 1.74		(1) 0.18		
12					(2T) 1.00	(2T) 10.4
13		(1) 1.74				
14		(1) 1.74		(1) 0.18	(1) 0.57	(1) 2.7
	10.4	22.7	0.8	1.3	2.7	18.4

Note: Mech Cost - See Memo from from K. McGrath.

TOTAL VENT SYSTEM 56.3

[redacted]

APPENDIX I - UTILITIES

KC 1223 SCRTD/METRO RAIL
UTILITIES

3/21/83
JEK

STATION DESIGNATION	STATION LENGTH	OTHER CUT/CUT & COVER LENGTH	$ IN ESTIMATE FOR UTILITY SUPPORT (UTIL SUPPORT NOT IN ESTIMATE)	UNIT COST FOR UTILITY SUPPORT ($/LF) [1]	$ OMITTED FROM EST. FOR UTIL. SUPPORT [2]	$ IN ESTIMATE FOR UTILITY RELOCATION	UNIT COST FOR UTILITY RESTORE ($/LF) [7]	$ OMITTED FROM EST. FOR UTIL. REST. [3]	ADD FAC. TELEPHONE @ $430/LF [4]	ADD DWP POWER @ $470/LF [5]
UNION STATION	640	2271	511600	809	1840000	0	0		[6] 1478000	[6] 535400
1ST & HILL	631	460	773950	1226	322000	396500	628	289000	193000	216000
5TH & HILL	631		1003650	1591		599360	950			
7TH & FLOWER	740		654250	925		1283160	1734			
ALVARADO / WILSHIRE	490	320	73500	151	139000	40740	96	88000	386000	432000
VERMONT / WILSHIRE	567		379600	670		261360	462			
NORMANDIE / WILSHIRE	672		561500	845		1532600	2281			
WESTERN / WILSHIRE	660		558300	846		1514720	2295			
LA BREA / WILSHIRE	660	1010	562950	853	862000	494200	750	758000	424000	475000
FAIRFAX / WILSHIRE	955		1186300	1267		607720	434			
BEVERLY / FAIRFAX	685	920	239500	350	322000	13400	20	18000	366000	432000
SANTA MONICA / FAIRFAX	680		501800	739		465140	713			
LA BREA / SUNSET	690	460	564300	819	377000	1162100	1684	775000	193000	216000
HOLLYWOOD / CAHUENGA	635	1750	286400	451	564000	126940	200	250000	625000	588000
UNIVERSAL CITY	630		103000	163		NOT ESTIMATED				
NORTH HOLLYWOOD	672	1360	567800	845	1149000	NOT ESTIMATED	(439 1600)	2176000	571000	639000
	10618	6380			5427000			4354000	3156000	3533000
									1104000	

[1] COL 3 ÷ COL 1
[2] COL 2 × COL 4
[3] COL 6 ÷ COL 1
[4] COL 7 ÷ COL 2
[5] 5,000,000 ÷ 10618 LF
[6] 1/2 UNIT COST USED
[7] AMOUNT SHOWN EXCLUDES SURFACE RESTORATION COSTS WHICH WERE DUPLICATED IN ESTIMATE

TOTAL TO BE ADDED 16,670,000

APPENDIX J - UNDERPINNING

KC1223 SCRTD/METRO RAIL UNDERPINNING

3/21/83
JEK

DMJM/PBQD UNDERPINNING ESTIMATE RECAP

REACH	UNDERPINNING DESCRIPTION	1 TAB: "REACH G1-G17"	2 TAB: "UNDERPINNING" STATIONS	3 TAB: "UNDERPINNING" X-OVERS	4 TAB: "STATION SHELL"	5 ESTIMATE SUMMARY MATRIX	6 LF STATION CUT	7 LF OTHER CUT	8 ADDITIONAL UNDERPINNING $	9
1	FREEWAY / L.A. RIVER	20000000				20000000				
(	UNION STATION	0								
↓	RAILROAD TRACKS	0							360000	(8 TRACKS @ $120,000)
2	BRIDGE	250000				300000				
(	1ST & HILL STATION	1000000	1000000		1008000	8600000	631	460	730000	
↓	5TH & HILL STATION	7580000	7600000		315000					
3	7TH & FLOWER STATION	3230000	3230000		2216000	3200000				
4	ALVARADO/WILSHIRE STATION	120000	120000			100000	490	520	225000	
5	X-OVER @ VERM/WILS STA.	80000		80000		100000				
(	VERMONT/WILSHIRE STATION	0								
↓	NORMANDIE/WILSHIRE STA.	2725000	2725000			2700000				
6	WESTERN/WILSHIRE STA.	1050000	1050000		206000	1000000				
7	LA BREA/WILSHIRE STA	500000	500000			500000	660	1010	745000	
8	X-OVER @ FAIRFAX/WILS. STA.	1200000		1096000		1200000				
↓	FAIRFAX/WILSHIRE STATION	300000	300000			900000				
9	BEVERLY/FAIRFAX STATION	0		780000						
10	X-OVER	675000		150000		700000				
(	SANTA MONICA/FAIRFAX STA.	510000	510000			1000000				
↓	LA BREA/SUNSET STA.	510000	510000							
11	HOLLYWOOD/CAHUENGA STA	315000	315000		264000	300000				
↓	POCKET TRACK	160000		160000		200000				
13	BLUFFSIDE BRIDGE	3000000				5100000				
↓	UNIVERSAL CITY STATION	0								
14	RAILROAD TRACKS	0							240000	(2 TRACKS @ $120,000)
(	X-OVER	550000		350000		600000				
↓	NORTH HOLLYWOOD STA	0								
		44365000			4081000	44500000			2300490	

SUMMARY

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3 26 83

Sheet 0 of Estm DRL Ckd ITEM

Plan Sheet No. Bid Quantity 1 TRACK SPAN

Spec. Ref. Take-off Quantity

Item Desc. UNDERPIN R.R.

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
SUMMARY UNDERPIN RAIL ROAD													
SHEET # 1	CALL UNION STATION # 120,000 EACH												- 0 -
SHEET # 2													8740 -
SHEET # 3													11500
SHEET # 4	CALL NO HOLLYWOOD # 125,000 EACH												10930 -
SHEET # 5													11210 -
SHEET # 6													21323 -
SHEET # 7													5000
SHEET # 8													43000
SHEET # 9													5000
					CALL						# 117,000		

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-26-83

Sheet 1 of Estm DDL Ckd ITEM

Plan Sheet No. Bid Quantity 1 TRACK SCAN

Spec. Ref. Take-off Quantity

Item Desc. UNDERPIN R.R.

FORM E240E HOECKEL'S 347980

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
UNDERPIN RAIL ROADS: THERE ARE TWO LOCATIONS THAT MIGHT REQUIRE UNDERPINNING FOR RAILROADS. THE SANTA FE YARDS IN THE UNION STATION AREA AND THE DOUBLE TRACK AREA OVER THE NORTH HOLLYWOOD STATION. REGARDLESS PRIOR PERMITS IT IS A GOOD POSSIBILITY THAT "X" NUMBER OF TRACKS MAY BE REQUIRED TO BE KEPT OPEN FOR RAIL TRAFFIC. THIS IS AN ESTIMATE FOR UNDERPIN COSTS PER TRACK (2 RAILS)													

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-26-83

Sheet 2 of ____ Estm DRK Ckd ✓ ITEM ____

Plan Sheet No. ____ Bid Quantity 1 TRACK SPAN

Spec. Ref. ____ Take-off Quantity ____

Item Desc. UNDERPIN RR DEPOT FOR

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
UNDERPIN RAILROAD - ASSUME AN OUTAGE OF ONE WEEK TO ERECT AND UNDERPINNING STRUCTURE FOR EACH STATION / TRACK SPAN.													
REMOVE TRACK:													
FOREMAN	10 HRS.		35.00						35.00				350
CRANE	10 HRS.		91.00		72.00		38.00		201.00				2010
LOW BOY TR.	10 HR.		30.00		Lo Boy 300 RENT				30.00 + RENT				600
LOADER.	10 HR		30.00		16.00		13.00		59.00				590
8 LABORERS	100 HRS.		26.00						26.00				2600
SMALL CRANE	10 HR.		32.00		19.50		14.10		65.60				660
WELDER TORCH	10 HR.		30.00		3.20		6.00		39.20				390
SPECIAL TOOLS	RAILROAD RENTAL												500.00
R.R. INSPECTOR	36		15.00 AVE.										500.00
													540
									TOTAL SHEET				8740

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-26-80

Sheet 3 of Estm DRL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity 1 - TRACK SPAN

Spec. Ref. Take-off Quantity

Item Desc. UNDER PIN R.R.

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
UNDER PIN RAILROAD													
PRE DRILL HOLES: ACCOMPLISHED BY STATION PILE DRILLING - (SEE WORK UP ON STATIONS) THIS RATE IS 4 PILES / SHIFT HOWEVER AS THIS EXACT SCHEDULING DOUBTFUL ALL 1/2 DAYS -													
DRILL PILING: FROM SHEET 4 SOLDIER PILE/LAG.	12 HRS							390 80					$ 4700 00
SEAT STICK PILE: FROM SHEET 5	12 HRS							564 90					$ 6800 00
								TOTAL SHEET					$ 11,500 00

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-26-83

Sheet 4 of Estm DDL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity 1 TRACK SPAN

Spec. Ref. Take-off Quantity

Item Desc. UNDERPIN RAIL ROAD DEEP I BEAM

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
UNDER PIN RAILROAD													
CARRYING BEAM TO BE BUILT UP DEEP I BEAMS - THESE TO BE FULLY BUILT UP, WELDED, ASSEMBLED AND STORED ADJECENT TO SITE PRIOR TO OUTAGE:													
MAKE UP BEAMS:													
FOREMAN	24 HRS	33	00					33	00			792	00
CRANE (OFF LOAD)	8 HRS	91	00	72	00	38	00	201	00			1608	-
WELDERS (4)	96 HR	30		3	20	6	00	39	20			3763	-
LABORERS	48 HR	26	-					26	-			1248	-
FLATRACK	24 HR	28	-	7	00	4	40	39	40			946	-
STINGER ON-OFF	24 HR.	32	00	19	50	14	10	65	60			1575	-
MISC SUPPLY (LAYDOWN AREA - WELD -)												1000	
								TOTAL SHEET -				10932	00

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-26-83

Sheet 5 of Estm DRL Ckd K ITEM

Plan Sheet No. Bid Quantity 1 TRACK SPAN

Spec. Ref. Take-off Quantity

Item Desc. UNDERPIN RAIL ROAD

FORM E240E HOECKEL'S 347860

DEP-OH FOG

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
UNDERPIN RAIL ROAD													
PLACE CARRYING BEAM PILE CAPS AND ERECT STRUCTURE.													
ERECT STRUCTURE:													
FOREMAN	16 HRS		35 -						35 00				560 -
CRANE	16 HRS		91 00		72 00		38 00		201 00				3216 -
STINGER CRANE	16 HRS		32 00		19 50		14 10		65 60				1050 -
LO BOY	16 HRS		30 -		(RENT 200)				30 00 + RENT				1080 -
FLATRACK	16 HRS		28 -		7 00		4 40		39 40				630 -
IRON WORKERS 3	48 HRS		30 -						30 00				1440 -
WELDER 2	32 HR		30 -		3 00		6 00		30 00				960 -
LABORERS 2	32 HRS		26 -						26 00				832 -
MISC - SMALL TOOLS ETC													500 -
RR INSP.													1000 -
									TOTAL SHEET -			#	11,268 00

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-83

Sheet 6 of Estm DRL Ckd K ITEM

Plan Sheet No. Bid Quantity 1 - TRACK SPAN

Spec. Ref. Take-off Quantity

Item Desc. UNDERPIN RAIL ROAD

FORM E240E HOECKEL'S 347860

DEP OH FOG

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
UNDERPIN RAIL ROAD													
RELAY RAIL - LOAD OUT IN LOW BOY FROM STORAGE AND ASSEMBLE:													
OVERTIME WORK - AS ONE WEEK OUTAGE SUM - PROBABLY CATCH THE WEEK END.													
RELAY RAIL:													
FOREMAN	16 HR	53-						53 00					848-
CRANE	16 HR	137-		72 00		38 00		247 00					3950-
LO BOY	16 HR	48-			300 RENT			48 00	+ RENT				1368-
LOADER	16 HR	45-		16 00		13 00		74 00					1184-
8 LABORERS	128 HR	39 00						39 00					4992
SMALL CRANE	16 HR	48-		19 50		14 00		67 50					1080
IRON WORKER	32 HR	45 00						45 00					1440
FLAT RACK	16 HR	42-		7 00		4 40		53 40					854
DUMP TRUCK	16 HR	48 00		12 50		17 00		77 50					1240-
WELDERS	16 HR	45 00		3 20		6 00		54 20					867-
SPECIAL TOOLS	(TIE TAMPER - OPER)												2500
RR INSPECTOR													1000-
								TOTAL SHEET					$21,323

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3.26.85

Sheet 7 of Estm ORL Ckd K ITEM

Plan Sheet No. Bid Quantity 1 TRACK SCHM

Spec. Ref. Take-off Quantity

Item Desc. UNDER PIN RAIL ROAD

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
UNDER PIN RAIL ROAD													
MATERIALS:													
TIES	50 EA							20%					1000 00
BALLAST	60 CY							15%					900 -
SPIKES BOLTS PLATES	LS												300 - 1000 -
MISO													--- ↓
								CALL					5000 -

ASSUME: MAY RELAY EXISTING TRACK

NEW MATERIALS:

- BALLAST
- TIES
- TIE PLATES / FASTENERS
- SPIKES. BOLTS ETC

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-26-85

Sheet 8 of Estm DPL Ckd K ITEM

Plan Sheet No. Bid Quantity 1 TRACK SPAN

Spec. Ref. Take-off Quantity

Item Desc. UNDERPIN RAILROAD

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
UNDERPIN RAIL ROAD MATERIALS COMP													
STRUCTURAL STEEL:													
4 PILING - 4 x 60 x 150 = 18T													
PILE CAPS 2 x 10 x 200 = 2T													
CARRYING BEAMS I's 2 x 70 x 250 = 18T													
BUILD UP MBRS 5T													
43 TON													
43 TON	43 TON					1000							$43,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRID DATE 3-26 83

Sheet 9 of 10 Estm ARL Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. UNDERPIN RAIL ROAD

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
UNDERPIN RAIL ROAD: THE RAILROAD WILL REQUIRE THAT A TEST TRAIN (PROBABLY A YARD SWITCH ENGINE & SEVERAL CALL) MAKE A HALF DAYS TEST RUNS OVER TRACK PLUS ADJUSTMENT.													
START UP - TEST - ADJUSTMENT									SAY				5000
NOTE THE NO HOLLYWOOD CROSSING WILL REQUIRE SPECIAL DECKING & TIES & FASTENER & SWITCH TIE IN. PROBABLY $5000 MORE													

APPENDIX K - TRAFFIC MAINTENANCE

TRAFFIC MAINTENANCE

DMJM/PBQD SUMMARY 3/21/83

KC1223 SCRTD/METRO RAIL JEK

	1	2	3	4	5
STATION DESIGNATION	6' CHAIN LINK FENCING LF	$/LF	$	MISC. $	TOTAL TRAFFIC MAINT $
UNION STATION	1500	6	9000	6000	15000
1ST & HILL	1550	5.75	8900	32750	41650
5TH & HILL	1700	5.75	9800	39200	49000
7TH & FLOWER	1860	5.75	10700	42900	53600
ALVARADO / WILSHIRE	1140	5.75	6600	4400	11000
VERMONT / WILSHIRE	2140	5.75	12300	2700	15000
NORMANDIE / WILSHIRE	1540	6	9250	6150	15400
WESTERN / WILSHIRE	1760	5.75	10150	6850	17000
LA BREA / WILSHIRE	1560	6	9350	6250	15600
FAIRFAX / WILSHIRE	2160	6	13000	8700	21700
BEVERLY / FAIRFAX	1610	6	9650	6450	16100
SANTA MONICA / FAIRFAX	1660	6	10000	6600	16600
LA BREA / SUNSET	2250	6	13500	5600	19100
HOLLYWOOD / CAHUENGA	2240	6	13450	5550	19000
UNIVERSAL CITY	3700	6	22200	7800	30000
NORTH HOLLYWOOD	1540	6	9250	6150	15400
			TOTAL		371150

APPROXIMATION ESTIMATE
TRAFFIC MAINTENANCE
KC 1223 SCRTD/METRO RAIL

3/21/83
JEK

STATION DESIGNATION	LENGTH STA.	LENGTH OTHER CUT	LENGTH TOTAL	DIVERSION	ON STREET CUT	AM/PM REVERSE	DURATION (WEEKS)	SET-UP/TEAR DOWN CREW HOURS	MAINT. CREW HOURS/WEEK	TOTAL CREW HOURS	LABOR & EQUIPMENT COSTS *	6' CHAIN LINK FENCE LF	6' CHAIN LINK FENCE $	SIGNS & BARRICADES ALLOW $	TEMP. PAVE. & STRIPING ALLOW $	TOTAL MAT'L/SUBC. COST $
UNION STATION	640	2277	2917	N	N	N	116	50	8	1008	201600	6800	40800	40000	15000	95800
1ST & HILL	631	460	1091	Y	Y	N	116	240	15	1980	396000	2600	15600	100000	30000	145600
5TH & HILL	631	—	631	Y	Y	N	121	160	15	1975	395000	1700	10200	70000	20000	100200
7TH & FLOWER	740	—	740	Y	Y	N	130	160	15	2110	422000	1860	11200	75000	25000	111200
ALVARADO/WILSHIRE	490	920	1410	N	N	N	130	120	8	1160	232000	3280	19700	30000	12000	61700
VERMONT/WILSHIRE	567	—	567	N	N	N	133	80	8	1144	228800	2140	12800	20000	10000	42800
NORMANDIE/WILSHIRE	672	—	672	Y	Y	Y	156	160	40	6400	1280000	1540	9200	75000	25000	109200
WESTERN/WILSHIRE	660	—	660	Y	Y	Y	156	160	40	6400	1280000	1760	10600	75000	25000	110600
LA BREA/WILSHIRE	660	1010	1670	Y	Y	Y	136	320	40	5760	1152000	3900	23400	100000	30000	153400
FAIRFAX/WILSHIRE	935	—	935	Y	Y	Y	147	240	40	6120	1224000	2160	13000	100000	30000	143000
BEVERLY/FAIRFAX	685	920	1605	N	N	N	108	80	8	944	188800	3700	22200	30000	12000	64200
SANTA MONICA/FAIRFAX	680	—	680	N	Y	Y	138	120	40	5480	1096000	1660	10000	75000	25000	110000
LA BREA/SUNSET	690	460	1150	Y	Y	Y	151	240	40	6280	1256000	3300	19800	80000	30000	129800
HOLLYWOOD/CAHUENGA	635	1250	1885	N	N	N	126	240	16	2256	451200	5100	30600	80000	25000	135600
UNIVERSAL CITY	630	—	630	N	N	N	112	80	8	976	195200	3700	22200	20000	10000	52200
NORTH HOLLYWOOD	672	1360	2032	N	Y	N	121	280	40	5120	1024000	4700	28200	100000	30000	158200
											10821000					

* CREW:
1 FMN @ 35.00 = 35.00
4 LAB @ 26.00 = 104.00
1 BH/FEL @ 30.00 = 30.00
EQUIPMENT ALLOW 31.00
TOTAL $200.00 /CREW HOUR

TOTAL MAT'L & SUBCONTRACT 1,723,500
TOTAL LABOR & EQUIP → 10,821,000
GRAND TOTAL 12,544,500

APPENDIX L - DEWATERING

KC1223 SCRTD/METRO RAIL
DEWATERING

3/21/83
JEK

STATION DESIGNATION	Summary of Dwm/P&QD Est. MONTHS	$/MO	$	KC ESTIMATE LS	$/MO	MONTHLY $	TOTAL $
UNION STATION	16	2650	42400	20000	12,000	192000	212000
1ST & HILL	16		42400			192000	212000
5TH & HILL	21		55650			252000	272000
7TH & FLOWER	18		47700			216000	236000
ALVARADO/WILSHIRE	13		34450			156000	176000
VERMONT/WILSHIRE	16		42400			192000	212000
NORMANDIE/WILSHIRE	22		58300			264000	284000
WESTERN/WILSHIRE	18		47700			216000	236000
LA BREA/WILSHIRE	22		58300			264000	284000
FAIRFAX/WILSHIRE	27		71550			324000	344000
BEVERLY/FAIRFAX	23		60950			276000	296000
SANTA MONICA/FAIRFAX	19		50350			228000	248000
LA BREA/SUNSET	21		55650			252000	272000
HOLLYWOOD/CAHUENGA	18		47700			216000	236000
UNIVERSAL CITY	19		50350			228000	248000
NORTH HOLLYWOOD	22		58300			264000	284000
			824150				4052000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTO DATE 3-16-83

WESTERN STATION

Sheet 1 of 2 Estm DDL Ckd / ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity 16 MONTHS

Item Desc. DEWATERING

FORM E240R HOECKEL'S 336481

DESCRIPTION	QUANTITY	DIR. LABOR		REP. LABOR		MAT'L		SUB-BID		E.O.E.		TOTAL	
		UNIT	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT

THE CONCEPTIONAL PRELIMINARY ESTIMATE PROVIDED A DEWATERING ESTIMATE OF 16 MONTHS AT $2650 PER MONTH.

REGARDLESS THE NATURE OR EXTENT THAT THE GEOTECHNICAL DATA REPORTS THE ABSENCE OF GROUND WATER A PRUDENT BIDDER SHOULD ALLOW AT LEAST FOR CONTROL OF SURFACE RUN OFF, FROM RAIN OR CONSTRUCTION WATER, AS WELL AS SOME SUBSURFACE WATER IN THE FORM OF PERCHED OR TRAPPED WATER.

GEOTECHNICAL REPORTS INDICATE THAT GROUND WATER IS BELOW GRADE IN THIS AREA THEREFORE AN EXTENSIVE WELL POINT OR DEEP WELL SYSTEM WOULD PROBABLY NOT BE REQUIRED, HOWEVER THIS TYPE OF ESTIMATE SHOULD ALLOW SOME PROVISION FOR A LOCAL, SUMP AND TRENCHING TYPE OF DEWATERING OPERATION AS PERCHED WATER IS REPORTED TO EXIST.

THE 16 MONTH PERIOD FOR DEWATERING SHOULD COVER THE SPAN OF REQUIRED OPERATIONS.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD — WESTERN STATION   DATE 3-16-83

Sheet 2 of 2   Estm DDL   Ckd ✓   ITEM

Plan Sheet No.   Bid Quantity

Spec. Ref.   Take-off Quantity 16 MONTHS

Item Desc. DEWATERING

FORM E240R HOECKEL'S 336461

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	~~REP. LABOR~~ DEP & OH UNIT	AMOUNT	MAT'L EQG UNIT	AMOUNT	SUB-BID UNIT	AMOUNT	E.O.E. UNIT	AMOUNT	TOTAL UNIT	AMOUNT
PROVIDE A SPREAD OF PORTABLE, MOBILE PUMPS OPERATING ONLY ON PART TIME BASIS, SINGLE SHIFT WITH SOME OVERTIME ALLOW.													
FOREMAN	(COVERED BY GEN. CONSTR. FOREMAN)												
PUMPMAN	16 Mo	$7000		} ALLOWS SOME OVERTIME									112000 ✓
PUMPMAN O.T.													
LABORERS (ON & OFF)	10 Mo	$6000											60,000 ✓
									RENT		OPER		
PUMPS 4" (2)	32 Mo	OPERATE 25% TIME		400 –			80.00		12800		2560 –		15360 ✓
PUMPS 3" (1)	16 Mo			350 –			55.00		5600		880 –		6480 ✓
STILLING BASINS SUMPS – CMP – MANIFOLDS HOSES	} ALLOWANCE												20000 ✓
											CALL		$213,840 ✓

-243-

APPENDIX M - TRACKWORK

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB SCRTD/MR DATE 3/31/83

Sheet 1 of 1 Estm AWJ Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. TRACKWORK SUMMARY

DCE. 15 5.80-2500 HOECKEL'S 334596

TRACKWORK SUMMARY - DIRECT COST

AREA	OMTM/ PBQD	KC	Δ
① MAIN YARD			
ⓐ RAILROAD - BALLASTED	$5,344,000	$3,026,600	⟨$2,317,400⟩
ⓑ TRANSIT - BALLASTED	$8,162,500	7,190,000	⟨$972,500⟩
ⓒ TRANSIT - DIRECT FIX.	$487,920	267,500	⟨$220,420⟩
SUBTOTAL	$13,994,420	$10,484,100	⟨$3,510,320⟩
② REACH 1 TO 14	$39,067,698	$28,202,500	⟨$10,865,198⟩
③ NORTH HOLLYWOOD TAIL TRACK	$606,000	$630,000	$24,000
TOTAL TRACKWORK.	$53,668,118	$39,316,600	⟨$14,351,518⟩

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB SCRTD/MK DATE 3/31/83

Sheet 1 of 2 Estm [illegible] Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. TRACKWORK - YARD

DCE. 15 5-80 2500 HOECKEL'S 334596

TRACKWORK PRICING - YARD

USE SCRTD TAKEOFF W/ KC UNIT PRICES (DIRECT COST ONLY)

① BALLASTED @ GRADE - RAILROAD

RELOCATE TRACK	1620 LF	@ 30^{00}/LF	=	48 600
NEW TRACK	32,900 LF	@ 70^{00}/LF	=	2,303,000
NEW No. 8 SWITCHES	5 EA	@ $30 000/EA	=	150,000
NEW No. 10 SWITCHES	15 EA	@ $35,000/EA	=	525 000
		SUBTOTAL	=	$3,026,600

ON JM/PBQD DIRECT COST = 5,344,000

∴ DEDUCT $2,317,400

② BALLASTED @ GRADE - TRANSIT

TRANSIT TRACK	45,000 LF	@ 85^{00}/LF	3,825,000
PIT TRACKS	1,500 LF	@ 150^{00}/LF	225 000
No. 8 SWITCHES	54 EA	@ 30,000/EA	1,620 000
No 8 DBL X-OVER (SCISSORS)	7 EA	@ 180,000/EA	1,260,000
No 8 SINGLE X-OVER	4 EA	@ 65,000/EA	260,000
	SUBTOTAL =		7,190,000

ON JM/PBQD DIRECT COST = 8,162,500

∴ DEDUCT $972,500

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB SCRTD/MR DATE 3/3/83

Sheet 2 of 2 Estm. AJ Ckd. ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. TRACKWORK - YARD

DCE. 15 5-80-2500 HOECKEL'S 334596

(3) TRANSIT TRACK - DIRECT FIXATION - YARD.

TRANSIT TRACK 2140 LF @ 125.00/LF = $267,500

DMJM/PBQD "DIRECT COST" * = 487,920

∴ DEDUCT $220,420

* MARK-UPS ADDED TWICE SO DIRECT COST IN THIS CASE = $228/LF

TOTAL DEDUCT MAIN YARD = $3,510,320

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB SCRTD/MR DATE 3/31/83

Sheet 1 of 2 Estm AW Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. TRACKWORK - REACH 1-14

DCE. 15 5-80-2500 HOECKEL'S 334596

TRANSIT TRACK - REACH No. 1 TO 14 QUANTITIES FROM SYSTEM TAKEOFF APPENDIX A

BALLASTED AT GRADE (NO QUANTITY FOR THIS ITEM)
SCHEMATIC SHOWS ALL C&C.
@ YARD END.

DIRECT FIXATION: 199,140 @ $125.00/FT = $24,892,500

ADD FOR No 10 DOUBLE SCISSORS X-OVERS
7 ea @ $300,000/EA 2,100,000

ADD FOR QUAD C&C NO. 10 SCISSORS X-OVER
PLUS TWO ADDITIONAL SWITCHES
ADJACENT TO THIS X-OVER
(BTWN MAIN YARD & UNION STA)
1 X-OVER @ $300,000/EA 300,000
2 SWITCHES @ 65,000/EA 130,000

ADD 6 SWITCHES (CONCRETED) FOR EACH
POCKET TRACK (2 ea) = 12 TOTAL
12 SWITCHES @ 65,000/EA 780,000

KC TOTAL DIRECT = $28,202,500

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB SCRD/MC DATE 3/31/83

Sheet 2 of 2 Estm AWJ Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. TRACKWORK - REACH 1-14

DCE. 15 5-80-2500 HOECKEL'S 334596

OMTM/PBQD DIRECT COST = 45,123,192 ÷ 1.155 (MARK-UP) = 39,067,698

∴ DEDUCT = $10,865,198

NOTE: OMTM/PBQD DIRECT COST FOR DIRECT FIXATION TRACK (WITH ALLOWANCE FOR X-OVERS & SWITCHES) IS $228/LF ÷ 1.155 = $197/TF

KC's DIRECT COST PRICE FOR DIRECT FIXATION TRACK ONLY = 125/TF

} Δ = $72.00/TF

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB SCRTD/NR DATE 3/31/83

Sheet 1 of 1 Estm AJ Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. TRACKWORK - N. HOLLYWOOD T.T.

DCE. 15 5 80-2500 HOECKEL'S 334596

TRACKWORK - N. HOLLYWOOD TMC TRACK.

DIRECT FIXATION TRACK ~ 3480 LF @ 125.00/FT = $435,000

CONCRETED SWITCHES ~ 3 EACH @ $65,000 $195,000

KC TOTAL DIRECT COST = $630,000

OMTM/PBQD DIRECT COST = 700,000 ÷ 1.155 = 606,000

∴ ADD = $24,000

SCREW / MR
ESTIMATE CHECK
QUANTITY CHECK - TRACKWORK

3/31/83
Awj

	1	2	3	4	5
	DWG 013	DWG 014	DWG 015	KC TOTAL	AWJ/M/ PBQD TOTAL
RAILROAD TRACK - YARD - BALLASTED AT GRADE					
No 10 SWITCH	4	—	9	13	15
No 8 SWITCH	1	—	7	8	5
TOTAL				21	20
NEW TRACK				27,000 ±	32,900
RELOCATE TRACK				?	1620
TRANSIT TRACK - YARD - BALLASTED AT GRADE					
No 8 DBL X-OVER	5	2	—	7	7
No 8 SING. X-OVER	—	—	2	2	4
No 8 SWITCH	12	34	11	57	54
TRANSIT TRACK				35,000 ±	45,000
PIT TRACK				?	1500
TRANSIT TRACK - DIRECT FIXATION - YARD					
TRACK				?	2190

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB SCRTD/MR DATE 3/30/83

Sheet 1 of 6 Estm [illegible] Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. TRACKWORK

DCE. 15 5-80-2500 HOECKEL'S 334596

UNIT PRICES: (WITHOUT MARK-UPS ⇒ DIRECT COST)

① RAILROAD TRACK: NEW 115# RAIL, TIMBER TIES, BALLAST

1982 DODGE GUIDE : $122.50/LF

RAILROAD BUILDERS : 65.00/LF

SCRTD DATA: (UNIT PRICE BK)

MEANS	62.66/LF
DODGE	124.85/LF
LSI	96.38/LF
SHARP & FELLOWS (QUOTE)	$60-70.00/LF
PACIFIC RR CONST "	60-65.00/LF
BOSTON ESCALATED PRICE	$125.00/LF
BALTIMORE	57.01/LF

USE: $70.00/LF

② No. 8. TURNOUT (SWITCH) RAILROAD

RAILROAD BUILDERS = $20-25,000/ea

BOSTON ESCALATED PRICE = $50,000/ea

BALTIMORE EST = $27,800/ea

USE = $30,000/EA

③ No 10. TURNOUT (SWITCH) RAILROAD

RAILROAD BUILDERS = $25-30,000/EA

1982 DODGE GUIDE = $27,845/EA

USE: $35,000/EA

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB SCRTD/MR DATE 3/30/82

Sheet 2 of 6 Estm [illegible] Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. TRACKWORK

DCE. 15 5.80-2500 HOECKEL'S 334596

④ RELOCATE TRACK - RAILROAD

ASSUME NEW BALLAST - REUSE ALL ELSE

RAILROAD BUILDERS QUOTE = $20.00/LF USE $30.00/LF

⑤ TRANSIT TRACK - NEW 115# CWR, CONC. TIES, BALLAST

1982 DODGE GUIDE $93.61/LF

CONCRETE VS. TIMBER TIES ADDS 15.00 ± /LF USE $85.00/LF

BALTIMORE (MAINLINE) EST = $72.50

⑥ No. 8 SINGLE X-OVER - BALLASTED

USE 2× No. 8 TURNOUT + $5,000 2×30,000 + 5,000 = $65,000/EA

⑦ No. 8 OBL X-OVER - BALLASTED. USE $130,000/EA

8 No. 8 OBL X-OVER (SCISSORS) BALLASTED

$130,000 + 50,000 (SCISSORS) USE $180,000/EA.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB SCRTD / MR. DATE 3/30/83

Sheet 3 of 6 Estm MW Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. TRACKWORK

DCE. 15 5.80-2500 HOECKEL'S 334596

⑨ DIRECT FIXATION TRACK.

ⓐ BENCHMARK PRICE $104.83/LF (1975 ESCALATED TO 1982)
(DIRECT COST ONLY)

ⓑ DENVER RTD ESTIMATE (9/75) = 60.00/LF. (DIRECT COST)
ESCALATE 65% = $39.00/LF

ⓒ RE-ESTIMATE USING DENVER RTD DETAIL EST.

115# RAILS	($460/TON)	= $17.65
SHOP WELD	(75.00/ea/30' RAIL)	= $ 3.85
FREIGHT		$ 2.40
FIELD WELD & X-RAYS		$ 1.00
TRACK SECONDARY POUR (CONC.)		5.50
DIRECT FASTENER	($24 × 1.6 ESCL)	$ 38.40
INSTALLATION LABOR	($20 × 1.7 ESCL)	34.00
		$ 102.80/LF.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB SCRTD / MR DATE 3/30/83

Sheet 4 of 6 Estm [illegible] Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. TRACKWORK

DCE. 15 5-80-2500 HOECKEL'S 334596

(d) ORAD COSTS ON BART (1970) (JOB 5018) OAKLAND TO FREMONT

FURNISH RAIL $194.00/TON USE $460/TON ⇒ $18.00/LF

CONCRETED TRACK (CWR) AERIAL ENR ESCL INDEX 1970-1982

LABOR	6.65	× 2.26	15.00/LF
PERM MATLS	8.73	2.98	26.00
EQUIP	1.41	2.98	4.00
SUPPLIES	2.68	2.98	8.00
SUBS	2.40	2.40	6.00

(AERIAL) Σ = $77.00/LF.

(e) ORAD BID ON BART 1970 - JOB 5039 OAKLAND - SF.

FURNISH RAIL $214.00/TON USE 460/TON = $18.00/LF

CONCRETED TRACK (ACT 6527 CWR TUNNEL) ($40.00/LF BID)

LABOR	10.18	× 2.26	23.00
PERM MATL	15.50	× 2.98	46.00
SUPPLIES	3.10	× 2.98	9.00
SUBS	3.43	× 2.40	8.00
EQUIP	(ALLOW)		8.00

(TUNNEL) $112.00/LF.

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB SCRTD / MR DATE 3/30/83

Sheet 5 of 6 Estm AWJ Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. TRACKWORK.

DCE. 15 5-80-2500 HOECKEL'S 334596

USE FOR DIRECT FIXATION TRACK @ 125.00/LF (DIRECT COST)

(10) NO. 10 DOUBLE SCISSORS CROSSOVER - CONCRETED

(a) A BALLASTED No 10 x-OVER ~ @ 35,000/EA

× 4 = @ 140,000

ADD FOR CROSSING PIECE = 50,000

@ 190,000/EA BALLASTED

"BALLASTED" LABOR DEDUCT (4 T.O.'s + X-INGS) = @ 4,000 × 5 <20,000>

ADD FOR CONC. TRACK LABOR @ 15,000 × 5 @ 75,000

CONCRETE VS BALLAST 25,000

@ 270,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

Item Analysis

JOB SCRTD/MR DATE 3/30/83

Sheet 6 of 6 Estm [illegible] Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. TRACKWORK.

DCE. 15 5-80-2500 HOECKEL'S 334598

⑥ BALLAST ESTIMATE

NO 8 TURNOUT - DIRECT FIXATION = 32 400
× 4 ea
129 600
+ CROSSING DIAMOND (D.F.) 24 800
$154,400

© DEMO BART COSTS (S.F. SEGMENT)
NO 10 SCISSORS X-OVER. (2 ea) ACT # 6340/6391
BID $135,000 /EA.

ACTUAL COST:		EXCL. LABOR	
LABOR	$65,700	2.26	148 000.
P.M.	65,000	2.98	194,000
SUPPLIES	3,700	2.98	11,000
SUBS	-0-	—	—
EQUIP	2500	2.98	8,000
		TOTAL	$361,000

$150,000 ÷ 20^{00}/MH = 7500 MH ÷ 8 = 937.5 MAN DAYS ÷ 20 MAN CREW = 47 DAYS
= 2 MOS +.

USE $300,000 /EACH.

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To ALE

Date 3/28/83

From AWJ.

Subject SCRTD/MR

TRACKWORK

GEORGE STANSEL -
TRACK EXPERT w/ ONTM
(213) 381-3663 EXT 426

① DIRECT AXATION -

② RESILIENTLY SUPPORTED - LESS COST.

$400/LF ③ FLOATING SLAB. - VIB & NOISE.
CRITICAL
CBS TELEVISION STUDIO. (NEAR BLDG FOUNDATIONS) POTENTIAL FUTURE DEV
(LA BREA TAR PITS - COUNTY MUSEUM.)

② PARTIAL ACCOUSTICAL CONTROL

CONC TIES IN RUBBER BOOT.
IMBED IN CONC. 2ND POUR.

OR.

DIRECT FIX w/ MORE RUBBER.

TIMBER TIES - PREFERENCE FOR
EMBEDED SWITCHES.

1/83 EST
↑ BASED ON DIRECT FIXATION.

TRANSIT - 115# RE MAIN LINE & YARD (CWR)
RR - 115# - YARD (RR WILL PROBABLY WANT CWR)
TIES - CONC
RR - TIMBER.

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date 3/28/83

From

Subject

GZ

PRICES:

2) RESILIANT = SLIGHTLY MORE THAN DIRECT FIXATION
$200/LF – SUPPLIED & SYSTEM
SALT CLAIMS THIS TOO LOW

3) FLOATING SLAB ~ $400/LF

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To ALL

Date 3/30/83

From AWJ

Subject SCRTD/MR.

RAILROAD BUILDERS INC.
4039 S. SANTE FE DRIVE (DENVER)
761-1993 (STEVE McCORMICK)

115# REAL NEW RR TRACKS { $70.00/LF - BID
$65.00/LF - W/O M.U. (CWR: #2-3/FT OVER JOINTED)

8 T.O. $20,-25-000 W/O MU. (~20% LABOR)

10 T.O 25-30K

TIMBER TIE $15-30 WOOD TIE 18-21" SP.
CONC TIE 2x $50-60 CONC TIE.

115# @ MILL $460/TON [39' FEET STD.
WELD 75.00/EA. [78' FEET "

NO 8 OBL CROSS-OVER: 4x
"X" + $50,000

AXATION FASTENER - ?

RELOCATE $20.00/FT NEW BALLAST -
REUSE ALL ELSE

AREA #4 OR #5 RR BALLAST.
ASTM CONC ROCK.

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To Jack

Date 3/25/83

From Al

Subject SCRTD / MR

TRACKWORK COSTS: 1982 DODGE GUIDE.
RAILROAD RAIL SYSTEMS:
(Pg 115-116) SINGLE TRACK/LF.

	E	M	E	T.
PLACE BALLAST	.27	9.60	.24	10.11
PLACE TIES (TIMBER)	.93	9.40	1.19	11.52
PLACE RAIL (CWR)	1.79	99.00	1.47	102.26
Σ =	2.99	118.00	2.90	123.89
L.A. ADJUST	×1.32	×0.98	—	—
TOTAL	#3.95	115.64	2.90	122.49
#10 SWITCH	2,750	24,650	57.00	27,457
L.A. ADJUST	×1.32	×0.98	—	—
TOTAL	3,630	24,158	57.00	#27,845

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To Mike

Date 3/25/83

From Andy

Subject SCRTD/MR.

TRACKWORK UNITS

1982 DODGE GUIDE

RAPID TRANSIT RAIL SYSTEMS - (HEAVY RAIL)

(Pg 115) SINGLE TRACK / LF

	L	M	E.	TOTAL
PLACE BALLAST	.27	9.60	.24	10.11
CONC TIES - PLACE	.93	13.60	1.19	15.72
RAIL (CWR) - PLACE	1.58	65.80	1.29	68.67
Σ =	2.78	89.00	2.72	94.50
LOS ANGELES ADJUST INDEX:	x 1.32	x 0.98	—	—
TOTAL	3.67	87.22	2.72	$93.61/LF

SWITCH #12/EA	$2,375	30,900	20.00	$33,295
L.A. ADJUST	x 1.32	x 0.98	—	—
TOTAL =	$3,135	30,282	20.00	$33437

DMJM/PBQD

SCRTD MC RAIL PROJECT
TRACK WORK

JOB No.
DESIGNED BY
APPROVED

SHEET No. 1 OF 2
DATE 5 JAN 1982
JB

TRACK COSTS ARE BASED ON THREE (3) PRIMARY SOURCES:

1) KAISER ENGINEERS BID PRICES FOR BOSTON METRO AND RAIL TRACK WORK, AND . . .

2) COST WORK UP FROM PBQD TRACK EXPERT GEORGE STANSKE, AND . . .

3) R.S. MEANS & COMPANY.

THE WORK IN BOSTON WAS BID AND LET IN MARCH 1981.
THREE LABOR TRADES ARE MOST GENERALLY USED:

COMMON LABOR
IRONWORKER
EQUIPMENT OPERATOR

THE MARCH '81 BOSTON RATE FOR COMMON LABOR WAS $ 14.05/HR.
LOS ANGELES DECEMBER RATE FOR COMMON LABOR IS $ 18.13/HR.
THE DIFFERENCE IS + 29%.

IRONWORKERS DIFFERENCE IS +15%

EQUIPMENT OPERATORS DIFFERENCE IS + 15%

AN ANALYSIS OF BOSTON WORK SHOWS THAT:

LABOR COMPRISES	9%	OF THE TOTAL JOB VALUE
EQUIPMENT "	3%	"
FERROUS METALS "	23%	"
NON-FERROUS METALS "	1%	"
SUB CONTRACTS "	4%	"

CONCLUSION: EVEN THOUGH LABOR RATES ARE DIFFERENT BY 15% TO 30% THE TOTAL LABOR SHARE OF THE COST PIE DOES NOT HAVE SIGNIFICANT IMPACT. MATERIALS IN THE PRESENT DEPRESSED MARKET HAVE NOT CHANGED TO ANY DEGREE.

A COMPOUNDING OF A 30% INCREASE IN LABOR AND A 10% INCREASE IN ALL OTHER SEGMENTS OF WORK PRODUCES A NET TOTAL INCREASE OF 12%.

THIS 12% WAS USE TO FACTOR THE BOSTON COSTS TO PRESENT DAY LOS ANGELES COSTS.

RAILROAD TRACK No. 5a AT $110.00/LF + 12% = 123.20 USE $125.00 LF

No. 8 TURN OUT No. 16a AT $39,000 + 12% = 44,000 USE $50,000 L

No. 8 DBL X OVER No. 17a AT $201,000 + 12% = 225,120 USE 225,000/EA

No. 8 SING. X OVER No. 18a AT $89,000 + 12% = $99,680 USE 100,000/EA

TRANSIT TRACK

BASE COST OF FASTNER @ 24" SPACING	$ 60
MATERIAL COST ON CONCRETE	10
LABOR @ 5 HRS TRACK FOOT @ 22/HR	110
SUBTOTAL	$ 180
RAIL COST	17
OVERHEAD & PROFIT @ 15.5%	31
	$ 228 USE

DMJM
DANIEL, MANN, JOHNSON, & MENDENHALL
PLANNING · ARCHITECTURE · ENGINEERING · SYSTEMS · ECONOMICS
3250 Wilshire Boulevard · Los Angeles, California 90010 · 213/381-3663

CONSTRUCTION COST ESTIMATE

DATE _____

NAME R.R. TRACKS LOCATION _____

SUBJECT _____

JOB NO. _____ PHASE _____ PAGE ____ OF ____

Item	Description	Quantity	Unit	Unit Cost	Estimated Cost	Totals
	MEANS MODIFIED FROM 100% - 115%				62.66 LF	
	DODGE					
	BALLAST	10.20	/LF			
	TIES	11.82	/LF			
	RAILS	102.83	/LF		124.85 SY	$125/LF
	LSI					46.38/
	SHARP & FELLOWS	714-685-1577				$60-70/LF
	PACIFIC RAILROAD CONTRACTORS - TOM-213-539-0960					
	NEW 100# RAIL BALLAST, TIES, ETC					$60-65/LF
	KOPPERS TIMBER ROAD CROSSING					$370/LF
					LSE	$65/LF NEW WORK

Amounts Forwarded

DANIEL, MANN, JOHNSON, & MENDENHALL
PLANNING · ARCHITECTURE · ENGINEERING · SYSTEMS · ECONOMICS
3250 Wilshire Boulevard · Los Angeles, California 90010 · 213/381-3663

CONSTRUCTION COST ESTIMATE

DATE 17 AUG. /82

NAME METRO RAIL PROJECT LOCATION LOS ANGELES, CA.
SUBJECT CONVERSION - BALTIMORE RAIL COST TO 1982 L.A.
JOB NO. WBS-14-AAE PHASE STUDY PAGE 1 OF 2

Item	Description	Quantity	Unit	Unit Cost	Estimated Cost	Totals

MEANS - 1982 COST GUIDE
PAGE 65 (27) R.R. TRACK COSTS.
LF TRACK COST = L = 13.55 M = 35.60 (BARE)
MARKUP = 18.11% (SUBS O.H.&P.)

% RATIO: L = 13.55 / 49.15 = 0.2757
M = 35.60 / 49.15 = 0.7243

CITY COST INDEXES - MEANS PAGE 375 & 378

USE 5. - METALS FOR MATERIAL

L.A. 82 = 111.8 = 1.13273
BALT. 82 = 98.7

USE 2 - SITEWORK FOR LABOR

LA 82 = 111.4 = 1.2148
BALT 82 = 91.7

RATIO x CITY INDEX

LABOR = 0.2757 x 1.2148 = 0.3349
MATERIAL = 0.7243 x 1.13273 = 0.8204
1.1553 LA/BALT. FACTOR DIRECT COST

LA/BALT DC FACTOR x MARKUP =
118.11 x 1.1553 = 1.3645 LA/BALT $\frac{82}{79}$ SUB FACTOR

$16,031,076 (79 JUL 4) / 12,534,071 (75 DEC) = 1.279

1.279 x 1.3645 = 1.7542 CONVERSION FACTOR TO EQUATE DEC/75 BALT PRICES TO 1982 LA PRICES DIRECT COST ONLY)

Amounts Forwarded

DMJM
DANIEL, MANN, JOHNSON, & MENDENHALL
PLANNING·ARCHITECTURE·ENGINEERING·SYSTEMS·ECONOMICS
3250 Wilshire Boulevard · Los Angeles, California 90010 · 213/381-3663

CONSTRUCTION COST ESTIMATE

DATE 17 AUG/82

NAME METRO RAIL PROJECT LOCATION LOS ANGELES, CA
SUBJECT CONVERSION BALT RR COST TO LA COSTS
JOB NO. WBS-14-AAE PHASE STUDY PAGE 2 OF 2

Item	Description	Quantity	Unit	Unit Cost	Estimated Cost	Totals
	BALTIMORE REGION RAPID TRANSIT TRACKWORK COST MATE DATE ' ' --					
	CONVERT BALTIMORE DEC, 1975 PRICES TO MID 82 LA PRICES THROUGH USE OF FACTOR (1.7542.					
	MAIN LINE TRACK					
1	BALLASTED	8254 LF		72.48	598250 -	
2	DIRECT FIXATION	26713 LF		104.83	2800320 -	
3	RESILIENTLY SUPPORTED	43220 LF		112.88	4878800 -	
4	No. 8 TURNOUT (BALLAST)	17	EA	27778 -	472230 -	
5	No. 8 TURNOUT (D.F.)	8	EA	32391 -	259130 -	
6	No. 8 TURNOUT (RS)	4	EA	44404 -	177620 -	
7	CROSSING DIAMOND (BALLAST)	2	EA	24334 -	48670 -	
8	CROSSING DIAMOND (D.F.)	1	EA	24780 -	24780 -	
9	CROSSING DIAMOND (R.S.)	1	EA	31755 -	31760 -	
10	MISC. ITEMS		LS	71920 -	71920 -	$
4	EMERGENCY GUARD RAIL	9410	LF	11.63	109440 -	9,472,920 -
	YARD TRACKS					
12	TIMBER TIES, BALLASTED	13693	LF	57.01	780640 -	
13	CONCRETE TIES, BALLASTED	6613	CF	64.64	427460 -	
14	No. 6 TURNOUTS	43	EA	20330 -	874190 -	
15	CROSSING DIAMONDS (BALLAST)	3	EA	24335 -	73000 -	
16	MISC. ITEMS	1	LS	26310 -	26310 -	
17	No. 8 TURNOUT	2	EA	27780 -	55560 -	$ 2,237,160 -
	MAIN LINE					
18	CONTACT RAIL w/ HARDWARE	82680	LF	38.36	3171600 -	
19	INSULATORS	8268	EA	23.30	192650 -	
20	COVER BOARD	82680	LF	7.17	592820 -	$ 3,956,980 -
	YARD					
21	CONTACT RAIL w/ HARDWARE	25421	LF	23.90	607560 -	
22	INSULATORS	2542	EA	23.30	59230 -	
23	COVER BOARDS	25421	LF	7.17	182270 -	$ 849,150 -
	TOTAL (DIRECT COST)					$ 16,516,210 -
	Amounts Forwarded					

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To ACE

Date 3/25/83

From AWJ

Subject SCRTD/MR.

I. TRACKWORK - ITEMS & UNITS

1) RAILROAD TRACK - BALLASTED, AT GRADE
- a) RELOCATE TRACK — $50.00/LF
- b) NEW TRACK — $125/LF
- c) NEW No. 8 SWITCHES — $50,000/EA
- d) NEW No. 10 SWITCHES — $60,000/EA

2) TRANSIT TRACK - BALLASTED, AT GRADE
- a) TRANSIT TRACK — $75.00/LF
- b) PIT TRACKS — $75.00/LF
- c) No. 8 SWITCHES — $50,000/EA
- d) No. 8 OBL X-OVER — $225,000/EA
- e) No 8 SNGL X-OVER — $100,000/EA

3) DIRECT FIXATION
- a) TRANSIT — $228.00/LF

II. TRACKWORK - GROSS CHECK (MATH/QTYS)

TOTAL TF REACH 1-14 = 198,714 TF (FROM ENGG ANALYSIS)
LESS BALLASTED AT GRD = 1,200 TF
$197,514
× $228.00/TF
$45,033,192
BALLASTED 1200 LF @ 75.00 = 90,000
$45,123,192
MAIN YARD 16,300,000
TAIL TRACK 2900 LF @ $228.00 = 661,200
62,084,392 ✓
÷ = .00 TF TOTAL

TRACKWORK
SCRTD ESTIMATE CHECK
RECAP OF TRACKWORK EST.

3/25/83 AWJ

		1 QTY (SCRTD)	2 UNIT PRICE (SCRTD)	3 $ (SCRTD)	4 ROUNDED TOTAL (SCRTD)
1	RAILROAD TRACK BALLASTED AT GRADE - YARD				
2	RELOCATE TRACK	1620 LF	50.00	81,000	
3	NEW TRACK	32,900 LF	125.00	4,112,500	
4	NEW No. 8 SWITCHES	5 EA	50,000.00	250,000	
5	NEW No. 10 SWITCHES	15 EA	60,000.00	900,000	
6	OH+P & BOND CONST?			856,500	
7				6,200,000	$6.2M
8					
9					
10					
11					
12					
13					
14					
15	TRANSIT TRACK - BALLASTED AT GRADE - YARD				
16	TRANSIT TRACK	45,000 LF	75.00/LF	3,375,000	
17	PIT TRACKS	1500 LF	75.00	112,500	
8	No. 8 SWITCHES	54 EA	50,000	2,700,000	
19	No. 8 DGL X-OVER	7 EA	225,000	1,575,000	
20	No 8 SING X-OVER	4 EA	100,000	400,000	
21	OH+P+BOND			1,337,500	
22				9,500,000	$9.5M
23					
24					
25	TRANSIT TRACK - DIRECT FIXATION - YARD				
26	TRANSIT TRACK	2,190 LF	228.00	487,920	
27	OH+P+ BOND			112,080	
28				600,000	$0.6M
29					
30	TRANSIT TRACK - REACH 1 TO 14				
31	BALLASTED - AT GRADE	1,200 LF	75.00	90,000	
32	DIRECT FIXED	197,574 LF	228.00	45,033,192	
33				45,123,192	$45.3M
34					
35	TAIL TRACK - N. HOLLYWOOD				
36	DIRECT FIXATION	2900 LF	228.00	661,000	$0.7M
37					
38					
39					
40	TOTAL				$62.3M

APPENDIX N - TRACTION POWER

NOT USED

APPENDIX O - MAIN YARD

SUMMARY

KELLOGG CORPORATION
DIRECT COST ESTIMATE

JOB SCRID DATE 3-24-83

Sheet 0 of Estm. DOL Ckd. ✓ ITEM
Plan Sheet No. Bid Quantity
Spec. Ref. Take-off Quantity
Item Desc. MAIN YARD

FORM E2402E HOECKEL'S 347060

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
MAIN YARD : EXCLUDES BUILDINGS & TRACK WORK (NEW) BY OTHERS IN KC													
DEMOLITION													2,120,000
SITE PREP													770,000
STRUCTURAL													2,796,000
ROADS & PAVING													818,000
FENCING													196,000
LIGHTING													625000
													7,325,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRIO DATE 3-24-83

Sheet 1 of 6 Estm DRL Ckd ✓ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. MAIN YARD

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
MAIN YARD EXCLUDES BUILDINGS & TRACK WORK (NEW)													
DEMOLITION													
REMOVE RR TRACK	94175 LF			ALLOWS FOR HAUL TO STORAGE FOR ANY RELAY VALUE				12 00					1,130,000
REMOVE YARD SWS.	91 EA							1000 00					91 000
REMOVE MAIN LINE SW	1 EA.							1500 00					1500
REM. RETAIN WALLS	1054 CY							40 00					42 200
REM. IND. BLDGS.	3,258750 CF.							0 17					554 000
REM. CR. & CONC SILOS	6 EA.							5000 00					30,000
REM. GAS STA & EQUIP L.S.								20000 00					20,000
REM. CONC/ASP PAVE	436,500 SF			(IF CONC. BASE)						30			131 000
OFF SITE DISPOSAL	20,000 CY							6 00					120 000
								CALL					2,170,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-83

Sheet 2 of 6 Estm DDL Ckd K ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. MAIN YARD

FORM E240E HOECKEL'S 947860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
MAIN YARD CONT'D													
SITE PREPARATION													
CLEAR/GRUB	13 AC							2000	-				26 000
MACH EXCAV	107000 CY							2	00				214 000
ROUGH GRADE	45000 CY								50				23 000
FINE GRADE	45000 CY							1	00				45 000
SOLD. PILE/LAG	13300 SF							25	00				332 500
SHEET PILE	5300 LF							15	00				80 000
DISP./OFF SITE	L.S.												50 000
													$ 770 000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-83

Sheet 3 of 6 Estm DDL Ckd K ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. MAIN YARD

FORM E240E HOECKEL'S 947860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
MAIN YARD CONTD													
STRUCTURAL													
DESIGN / DRAWINGS AVAILABLE INDICATE THIS WORK TO BE PRIMARILY RELOCATION OF ONE FIRST STREET BENT (SERIES OF PILE) AND PORTAL STRUCTURE AT NEW SANTA FE CONNECTION.													
RECONSTR 1ST ST BRIDGE	LS.												
IF BENT ONLY - TOO MUCH HOWEVER - COULD BE EXTENSIVE - STAY WITH													1,100,000
PORTAL WALLS	4240 CY												
SA - LOT OF CONCRETE FOR PORTAL										400	1,696,000		
													$ 2,796,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-83

Sheet 4 of 6 Estm RDL Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. MAIN YARD

FORM E249E HOECKEL'S 247869

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
MAIN YARD CONT'D													
ROADS & PAVEMENT													
NOTE: SHEET #3 DMJM TAKE OFF													
ASPH. HEAVY DUTY } ASPH. LIGHT DUTY }													
ASSUMED TO BE 8" BASE 3" CONCR WITH A 1½" OVERLAY & 6" BASE WITH 4" ASPH. ACC FINISHED & STRIPED. W-24,20,16,10													
115,160 / 20 = 6000 ± FT — 342340 / 20 = 17,000													
ASPH. HVY DUTY	115,160 □'								2.25				259000
ASPH LT. DUTY	342,340 □'								.150				514,000
CONCR. CURB 8"	4200 FT.								6.00				25000
MISC. ALLOW SOME REFLECTORS / SIGNS / GUARD RAIL													20000
													± 818,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-83

Sheet 5 of 6 Estm DDL Ckd V ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. MAIN YARD

FORM E240E HOECKEL'S 347660

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
MAIN YARD CONT'D													
FENCE WORK													
W/BARB WIRE													
7' CL W 3 STR.	12900 LF							12.50					161250
16' GATES	1 EA							800.00					800
20' GATES	3 EA							1000.00					3000
24' GATES	2 EA							1200.00					2400
W/O BARB WIRE													
6' CL	1700 LF							10.00					17000
20	2 EA							1000.00					2000
24	2 EA							1200.00					2400
30	1 EA.							1800.-					1800
SIGNING - MISC													5000
												#	196,000

KELLOGG CORPORATION
DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-83

Sheet 6 of 6 Estm DDL Ckd ✓ ITEM
Plan Sheet No. Bid Quantity
Spec. Ref. Take-off Quantity
Item Desc. MAIN YARD

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
MAIN YARD CONT'D		DMJM WORK SHEET Y-43 (#28)											
LIGHTING		RELATES LIGHTING REQUIREMENTS HOWEVER SHOULD BE ALLOWANCE FOR LOCAL POWER SUBSTATION/SW YD & TRANSMISSION/DISTRIBUTION											
LIGHTING STANDARD	25 EA												500,000
SUB/SW YD	LS												50000
TRANS/DISTR.	LS.												75000
													$ 625,000

-276-

APPENDIX P - BUILDINGS-STRUCTURAL AND ARCHITECTURAL

NOT USED

APPENDIX Q - BUILDINGS-MECHANICAL AND ELECTRICAL

KC 1223 SCRTD / METRO RAIL

REC/GHm

Comparison of ELECTRICAL / MECHANICAL COSTS - BUILDINGS

3/30/83

DESCRIPTION	TOTAL COST (incl. O+P)	COST/SF	PLUMBING	COST/SF	HVAC	COST/SF	FIRE PROTECTION	COST/SF	ELECTRL	COST/SF
MAIN SHOP BUILDING	44.35 M	88.52 *	—	—	—	—	—			
MAINT. OF WAY BUILDING	3.0 M	89.83 *	—	—	—	—	—			
TRANSPORTATION BLDG	1.69 M	102.48	16,000	7.36	15.8,000	9.35	—		175,000	10.36
CAR CLEANER BLDG	0.38 M	99.42	28,000	7.36	25,000	6.59	—		41,000	10.68
TEST BUILDING	0.89 M	131.44	33,000	4.82	14,000	2.14	19,000	2.86	72,000	10.82
CAR WASHER	0.56 M	74.46 *	—	—	—	—	—		—	
TRACTION POWER	0.46 M	64.82	17,000	2.49	8,000	1.12	—		40,000	8.40
CONTROL BUILDING	1.5 M	150.22								

CHANGES REQUIRED MECHANICAL/ELECTRICAL BLDGS

CONTROL BUILDING 400 128,000

* INCLUDES MECHANICAL/ELECTRICAL COSTS

APPENDIX R - PARKING

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD. DATE 3-24-83

Sheet 1 of 2 Estm DRK Ckd ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. PARKING

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
SURFACE (AT GRADE) PARKING.													
ASSUME: AREA RUNS 200 TO 300 D' PER CAR WITH THRUWAYS - SAY 250 D' AVE.													
SELECTED SITES WILL REQUIRE:													
• DEMOLITION													
• SITE GRADING / LEVELING.													
• PRE COMPACTION													
• BASE COURSE													
• ASPHALT													
• STRIPING													
• FENCING													
• BUMPERS - SOME -													
• LIGHTING - ?													
• LANDSCAPING / IRRIGATION													
AT GRADE PARKING LOTS ARE SHOWN TO BE LOCATED AT													
• REACH 8 FAIRFAX / WILSHIRE													
• REACH 13 UNIVERSAL CITY.													

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD. DATE 3-24-83

Sheet 2 of 2 Estm DDL Ckd ~ ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. PARKING

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
SURFACE (AT GRADE) PARKING CONT'D													
	DMJM INDICATES AT EACH SITE THAT 80 - 90,000 □' OR 2 ACRES EACH OF AREA TO BE USED.												
SITE GRADING & PREPARATION													#20,000
BASE PLUS ASPH SURFACE	85,000 □' @ 0.60												#51,000
STRIPING	300 - 400 CARS				10,000 FT @ .30								3,000
BUMPERS													10,000
CURBS / PLANTERS / LANDSCAPING													30,000
FENCING - PERIMETER	1200 LF @ 10.00												12000
DEMOLITION													20000
LIGHTING													50,000
					200,000		(BALL PARK)						#196,000

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-83

Sheet 1 of 2 Estm DPL Ckd K ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. PARKING

FORM E240E HOECKEL'S 347860

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
PARKING GARAGES -													
CONCEPTUAL PRELIMINARY ESTIMATE AND THE SCHEMATIC DIAGRAM SHOW PARKING STRUCTURES AT REACHES 1-8-9-13-14.													
REACH 1	UNION STATION										2250 CAR		
REACH 8	FAIRFAX / WILSHIRE										1000 CAR		
REACH 9	BEVERLY / FAIRFAX										1000 CAR		
REACH 13	UNIVERSAL CITY										2000 CAR		
REACH 14	NO. HOLLYWOOD.										2500 CAR		

KELLOGG CORPORATION

DIRECT COST ESTIMATE

JOB SCRTD DATE 3-24-83

Sheet 2 of 2 Estm DOL Ckd K ITEM

Plan Sheet No. Bid Quantity

Spec. Ref. Take-off Quantity

Item Desc. PARKING

FORM E240E HOECKEL'S 347850

DESCRIPTION	QUANTITY	DIR. LABOR UNIT	DIR. LABOR AMOUNT	EQUIPM'T COST UNIT	EQUIPM'T COST AMOUNT	DIR. MAT'L UNIT	DIR. MAT'L AMOUNT	PM/SUB UNIT	PM/SUB AMOUNT	E.O.E. UNIT	E.O.E. AMOUNT	TOTAL UNIT	TOTAL AMOUNT
PARKING GARAGE CONT'D													
PARKING STRUCTURES (LESS LAND PURCHASE) RANGE FROM 3500 - 6500 / CAR SPACE.													
# 5,000 - / CAR SPACE A FAIR ESTIMATE.													
FOR OPEN TYPE MINE HVAC.													
REACH 1	2250			@	5000						11,250 000 ~		
8	1000				5000						5,000,000 ~		
9	1000				5000						5,000,000 ~		
13	2000				5000						10,000,000 ~		
14	2500				5000						12,500,000 ~		
											OK.		

[redacted]

APPENDIX S - CONTINGENCIES

[redacted]

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To FILE

Date 3/29/83

From AWJ

Subject SCRTD/MR

CONTINGENCIES (ALLOWANCE FOR CHANGE ORDERS - POST BID)

VALUE OF POTENTIAL CHANGE ORDERS WILL VARY WITH THE RISK OF THE WORK AND THE KNOWLEDGE OF CONDITIONS UPON WHICH THE DESIGN IS BASED. UNDERGROUND WORK WILL CARRY HIGHEST CONTINGENCY AND BUILDING WORK THE LOWEST.

USE SAME % OF WORK TYPE BREAKDOWN AS DEVELOPED FOR PROFIT ANALYSIS. (APPENDIX T)

WEIGHTED AVERAGE

$395 M	UNDERGROUND	@ 15% CONTING.	= $	59.25M
80 M	BUILDINGS	@ 5% "	=	4.00
980 M	HEAVY CONST	@ 10% "	=	98.00
Σ = $1,455M				$161.25

WEIGHTED AVE = $\frac{161.25}{1,455} = .1108 \Rightarrow 11\%$

APPENDIX T - CONTRACTOR MARK-UPS

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To Rick

Date 3/29/83

From Art

Subject SCETD/MR

PROFIT ANALYSIS

CONTRACTOR'S PROFIT TO BE BASED ON TYPE OF WORK.

PROFIT %	WORK TYPE	# IN CURRENT EST
20-30%	UNDERGROUND HIGH RISK	# 395 M (27% of work)
6-7%	BUILDING TYPE (LOW RISK)	# 80 M (5% of work)
10-12%	TYPICAL HEAVY CONSTRUCTION	# 980 M (67% of work

WEIGHTED AVERAGE

# 395 M	@ 25% PROFIT	=	# 98.75 M
80 M	@ 6½%	=	5.20 M
980 M	@ 11%	=	107.80 M
Σ = # 1,455 M			# 211.75 M

WEIGHTED PROFIT AVE = $\frac{\#\ 211.75}{1,455}$ = .1455

USE 15%

APPENDIX U - ENGINEERING, DESIGN AND CONSTRUCTION MANAGEMENT

NOT USED

[redacted]

APPENDIX V - AGENCY COSTS

NOT USED

APPENDIX W - WRAP-UP INSURANCE

NOT USED

APPENDIX X - ESCALATION

NOT USED

APPENDIX Y - CONSTRUCTION CONTRACT PACKAGING

KELLOGG

5601 South Broadway
Littleton, Colorado 80121

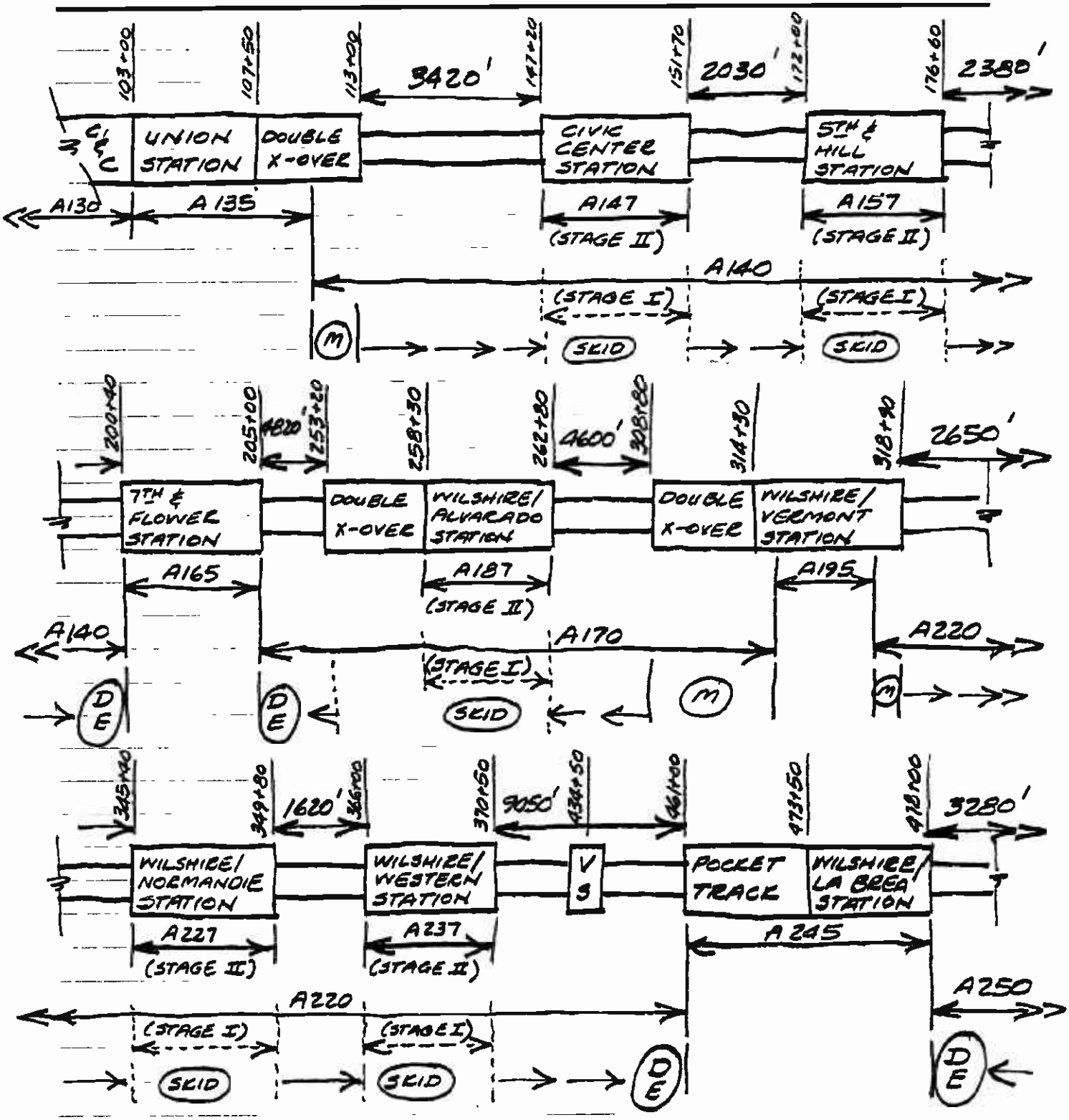
303/794/1818

To KC 1223 SCRTD FILES

Date 3-17-83

From JEK

Subject CONSTRUCTION CONTRACT
STAGING — PAGE 1 OF 2



KELLOGG

5601 South Broadway
Littleton, Colorado 80121

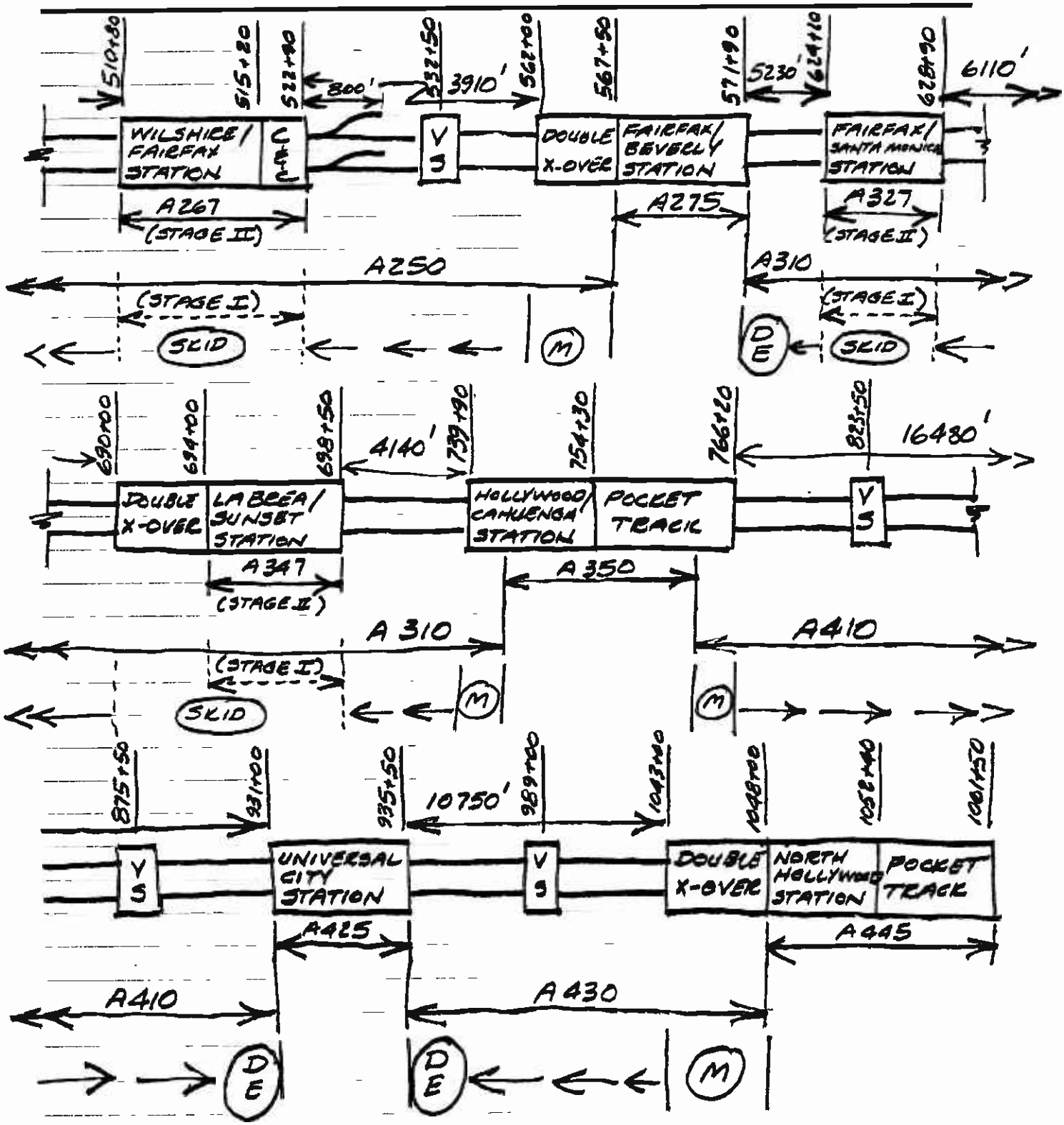
303/794/1818

To KC 1223 SCRTD/MR FILES

Date 3-17-83

From JGL

Subject CONSTRUCTION CONTRACT STAGING - PAGE 2 OF 2



KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date

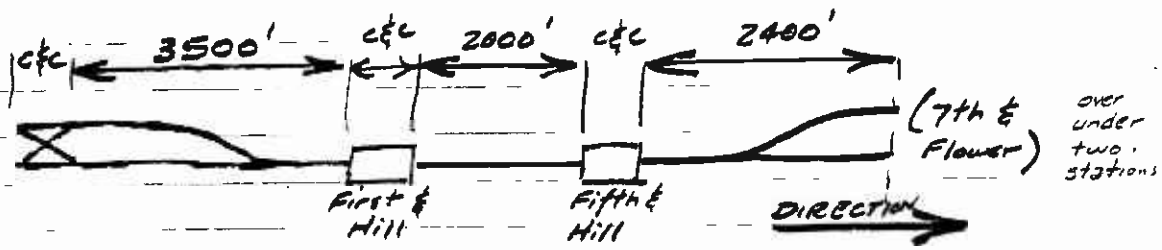
From

Subject

MAIN YARD — All Surface

REACH (1) — All Cut & Cover including Union Station less outbound cross-over (2).

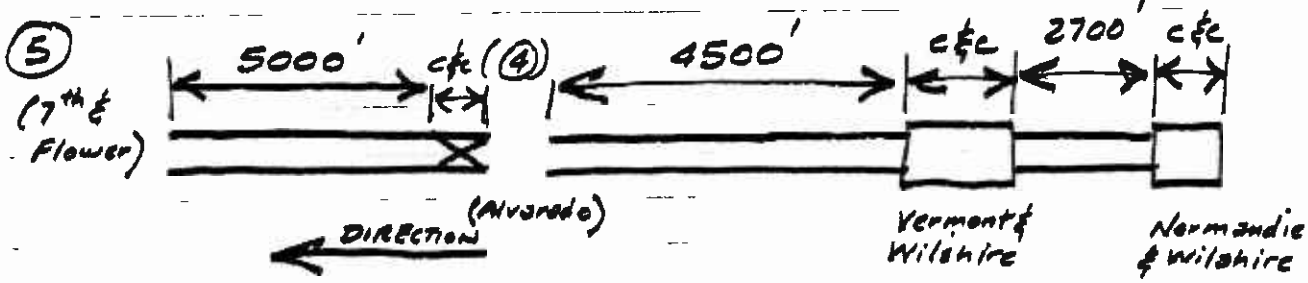
REACH (2)



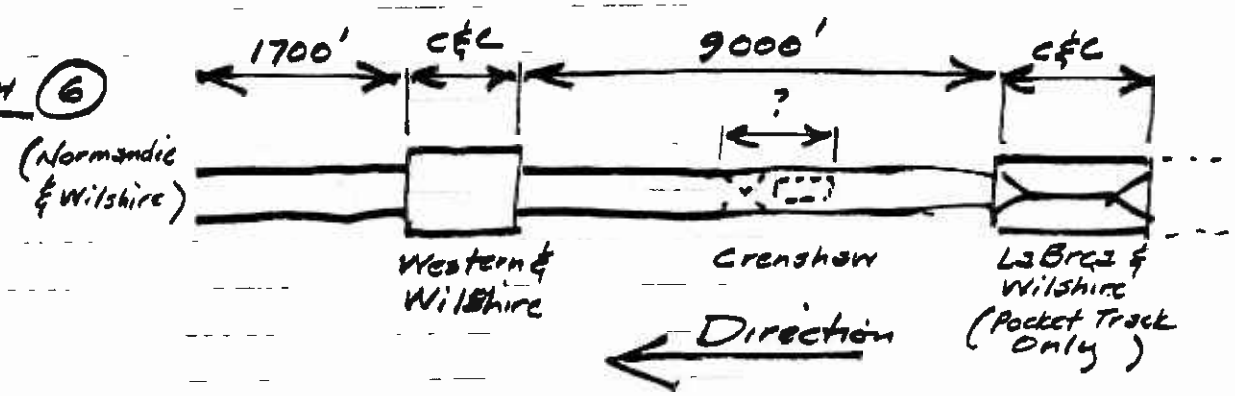
REACH (3) — All Cut & Cover including Seventh & Flower Station

REACH (4) — All Cut & Cover including Alvarado Station but excluding inbound cross-over (5)

REACH (5)



REACH (6)



KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

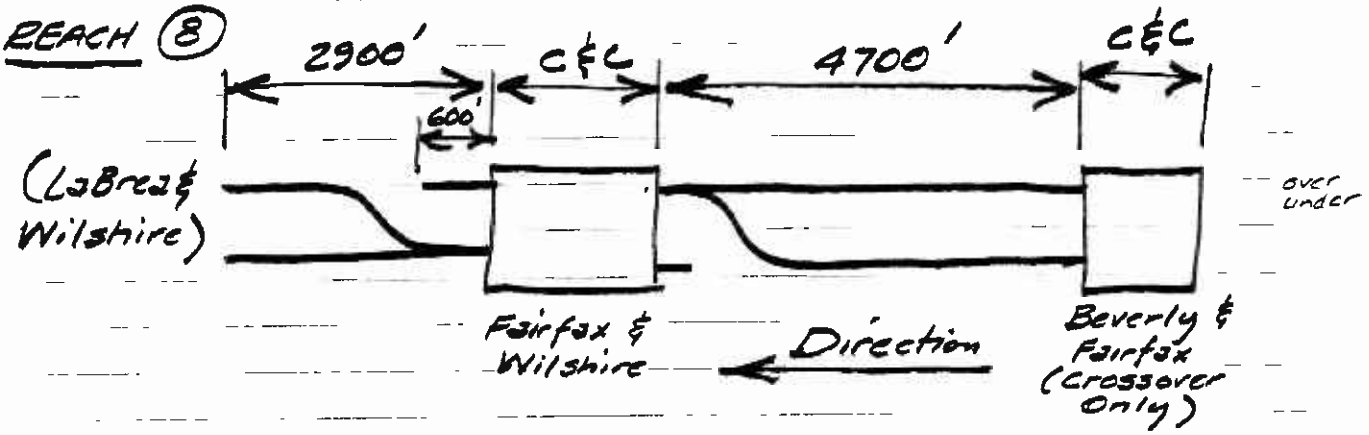
Date

From

Subject

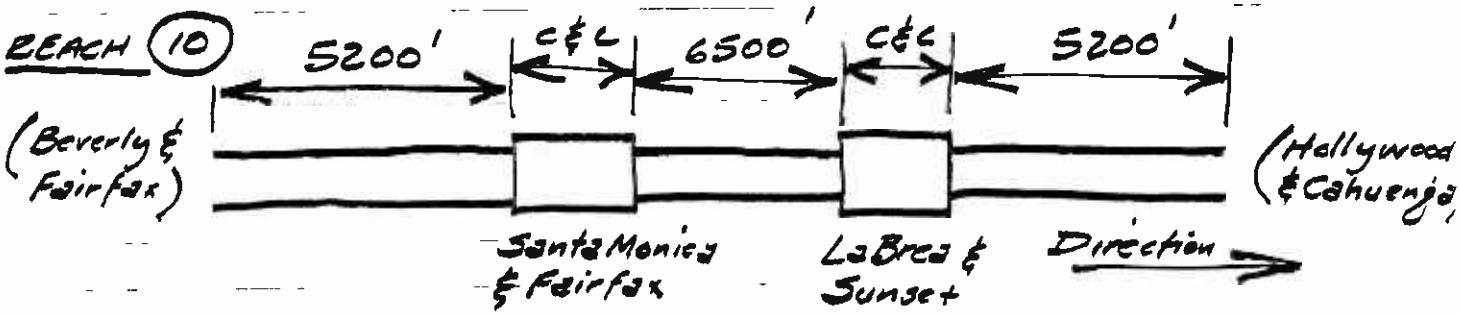
REACH (7) All cut & cover including LaBrea-Wilshire Station but excluding inbound pocket track (6).

REACH (8)



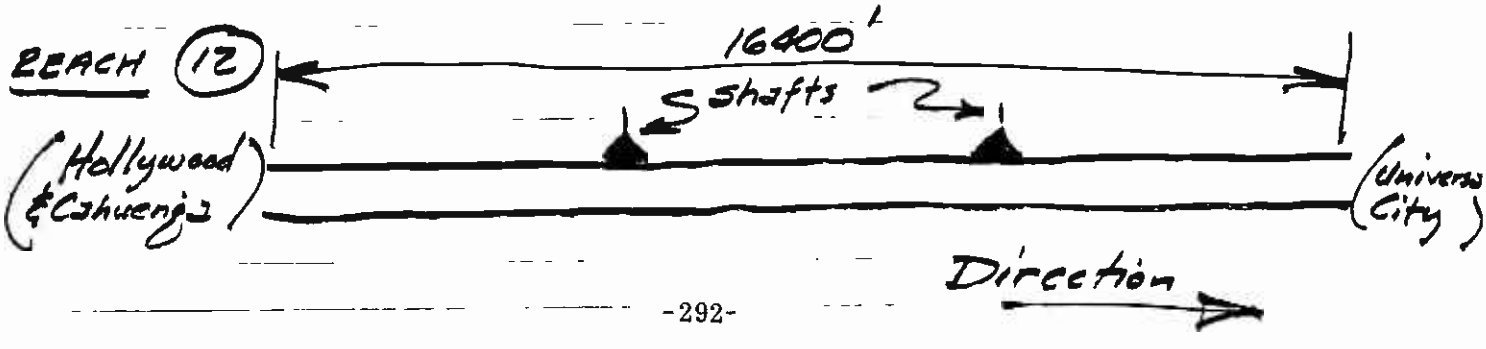
REACH (9) All cut & cover including Beverly & Fairfax Station but excluding inbound crossover (8).

REACH (10)



REACH (11) All cut & cover including Hollywood & Cahuenga Station and outbound pocket tracks.

REACH (12)



KELLOGG

5601 South Broadway
Littleton, Colorado 80121

303/794/1818

To

Date

From

Subject

REACH (13) All cut & cover including Universal City Station.

REACH (14) (Universal City)