D & D ENGINEERING, INC.

THE PARK @ LIVE OAK

SEWER AREA STUDY

JUNE 12, 2018

D & D Engineering, Inc.
8901 S. La Cienega Blvd.
Inglewood, CA 90301
424-351-6800

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I. INTRODUCTION

The purpose of this report is to determine the following:

- The expected average daily and peak wastewater flows from the proposed development based on the latest land use designations and building intensities.
- The impact of the proposed project on the existing City of Irwindale sewer system and pipe segments. The pipe segments are analyzed from the proposed development to the Sanitation District of Los Angeles (LACSD) trunk sewer lines.
- The capacities of the existing City and LACSD sewer lines and the adequacy of the existing sewer systems to convey the additional anticipated wastewater from the proposed project.

II. SITE DESCRIPTION

The Park @ Live Oak Project consist of 78.32 acres in the west portion of the City of Irwindale, immediately west of Interstate 605. Project site is bound by Arrow Highway on the North, Live Oak Avenue on the Southeast and Interstate 605 (I-605) on the East. Refer to the project site map, *Figure 1 — Vicinity Map,* for project site locations.

The existing site is a former sand and gravel quarry. Currently on-site backfill operations are underway to enable the redevelopment of the site. The Park @ Live Oak includes industrial, business park and commercial uses. The project consists of 1,451,400 sq. feet of industrial/business park and 98,600 sq. feet of commercial uses.

III. EXISTING SEWER SYSTEMS DESCRIPTION

The proposed project is located within the jurisdictional boundaries of the City of Irwindale and Los Angeles County Sanitation District (LACSD) District No.22. The wastewater flow originating from the project site will discharge to an existing City of Irwindale sewer line for conveyance to the LACSD Joint Outfall B Unit 8G Trunk Sewer, located in Live Oak Avenue at Myrtle Avenue. Please refer to *Figure 2 — Sewer System Exhibit* for existing sewer infrastructure.

The table below provides a summary of the existing sewer infrastructure in the vicinity of the proposed project. This summary is based on the latest available and reviewed record drawings. Please refer to *Appendix F - As-Built Plans* for copies of the City of Irwindale record drawings.

Location	Size	Notes
Arrow Hwy	Line B - City of Irwindale 15” Sewer Line	Sewer line flows west
Live Oak Ave	Line A – City of Irwindale 15” Sewer Line	Sewer line southwest of intersection with Arrow Hwy. Sewer line flows northwest to intersection of Live Oak Ave and Arrow Hwy
Live Oak Ave	Line C - City of Irwindale 21” Sewer Line	Sewer line between Arrow Hwy and private drive Line D. Sewer line flows west

Private Drive Alley	Line D - City of Irwindale 12" Sewer Line	Sewer line flows northwest to MH at Live Oak and private drive intersection
Live Oak Avenue	Line E - City of Irwindale 20" Sewer Line	Sewer line between private road intersection and outfall at Live Oak Ave and Myrtle Avenue. Sewer Line flows west

The original design of the Live Oak sewer was performed by Kenneth Mullen, Consulting Engineers to determine the sewer generation rates, tributary flows and sizes of proposed sewer lines to serve the entire tributary areas. Please refer to *Appendix E - LA Marketplace Sewer Design Live Oak Study* for copies of the tributary area map and sewer design calculations.

Additionally, David Evans and Associates, Inc. prepared a sewer area study dated June 2017 for the project site to determinate the capacity of existing sewer systems. The Sewer Area Study has been reviewed and accepted by the City of Irwindale. Please refer to *Appendix D — Sewer Area Study Arrow Pit Development dated June 2017* for a copy of the Sewer Area Study.

This sewer area study will utilize the findings of the above-mentioned studies and update the sewer generation flow calculations and existing sewer lines capacities based on the latest land use information and record drawings.

IV. PROPOSED DEVELOPMENT AND EXISTING SEWER FLOWS

The Park @ Live Oak consists of 1,451,400 sq. feet of industrial/business park land use and 98,600 sq. feet of commercial uses. The proposed project's sewer demand is estimated based on Los Angeles County Sanitation District (LACSD) sewage generation factors. The expected average and peak wastewater flows from the project are 322,325 GPD and 0.806 MGP respectfully. Please refer to LACSD Table 1, "Loadings for each class of land use" in *Appendix A — Estimated Average Daily Sewer Flows for Various Occupancies and Table 1 — Summary of Project Average Daily and Peak Sewer Flows* for project sewer demand calculations.

The proposed project site will have multiple points of connection (POC) to the existing sewer lines A and B. The majority of the site peak wastewater flow (approximately 88.8% of the peak flow) will be tributary to existing Line A along Live Oak Ave. The remaining site peak wastewater flow (11.2% of the peak flow) will be tributary to Line B along Arrow Hwy. Please refer to *Figure 2 — Sewer System Exhibit for proposed POC to existing sewer lines and Tables 1A and 1B* for Line A and Line B contributing flows calculations.

This sewer area study has utilized the same wastewater flows of 80 gpd/1000 sq.ft. from tributary areas that contribute to existing sewer lines as estimated per original LA Marketplace sewer study, except for the LA Racing site located south of Live Oak Avenue. The original sewer study wastewater flow estimate for LA Marketplace (now the LA Racing) was based on 20,000 attendances, where LA Racing has 6,000 attendances capacity. Please refer to *Table 1 C— Summary of Contributing Flows for LA Racing* for contributing flows calculations.

Existing sewer lines segments area contributing flows and cumulative contributing flows are summarized in *Table 2 — Sewer Capacity Summary*

V. SEWER PIPE CAPACITY ANALYSIS

Existing sewer lines A & B are 15" pipes diameters, line C is 21" pipe diameter, line D is 12" pipe diameter, and line E is 20" pipes diameter. Peak flow capacities for these lines, normal depths and velocities for peak flows were determined by using Kutter's Formula. Refer to Pipe Size Capacity Calculations in *Appendix C — Pipe Size Capacity Calculations*. Each main line is sized based on the minimum slope (worst case scenario) and half or 3/4 full pipe depending on the pipe size based on Los Angeles County guidelines. Note that LA County defines 100% DESIGN capacity for an existing pipeline, 15" or greater in diameter, as operating at ¾ full. A memo issued from the county, however, allows for the exceedance of this capacity. Refer to *Appendix B* for an excerpt from this memo.

As shown in *Table 2 — Sewer Capacity Summary* all existing City of Irwindale sewer lines have adequate capacity.

Additionally, a will serve letter request was submitted to LACSD for proposed development to verify trunk sewer line capacity. Based on the LACSD letter dated May 1, 2018 the District's Joint Outfall B Unit 8G Trunk Sewer has a capacity of 4.2 MGP and conveyed peak flow of 1.5 MGP when measured in 2012. This results in an available capacity of 2.7 MGP. The Park @ Live Oak Project will be contributing flow of 0.81 MGP to LACSD trunk sewer line. Therefore, existing trunk sewer line have enough available capacity for the proposed project. Please see LACSD will serve letter in *Appendix B.*

VI. CONCLUSION

A summary of existing pipe diameters, slopes, peak flows capacities and normal depts can be found in *Table 2 — Sewer Capacity Summary*. All existing sewer mains that will serve the project site, except for a portion of line E, meet the County capacity standards of no more than ½ full for mains under 15" diameter and no more than ¾ full for mains with a diameter of 15" and larger and will not negatively impact the available capacity of this sewer lines. The portion of Line E that exceeds the defined 100% capacity is also within the parameters allowed by the county memo. Refer to *Appendix B* and *Appendix C — Pipe Size Capacity Calculations*.

The project site will contribute 0.81 MGD to the LACSD Joint Outfall B Unit 8G Trunk Sewer, which does not exceed the available capacity of 2.7 MGD.

In summary the existing City of Irwindale collector lines have adequate capacity for the proposed project. Additionally, the existing LACSD sewer system have sufficient available capacity to serve the proposed project.

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Table 1 — Summary of Project Average and Peak Sewer Flows
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Table 1B — Sewer of Contributing Flows for Line A
Table 1C — Sewer of Contributing Flows for LA Racing
Table 2 — Sewer Capacity Summary

PARK @ LIVE OAK

TABLE 1 - Proposed Project Sewer Demand

Land use/Zone Type	Daily Average Generation Factor	Units	Area(SF)/ Unit Contribution	Daily Average Flow (GPD)	Peak Flow* (MGD)	Daily Average Flow (CFS)	Peak Flow* (CFS)
Industrial/Bussiness Park	200	gal/1000 SF	1,451,400	290,280	0.73	0.45	1.12
Commercial	325	gal/1000 SF	98,600	32,045	0.08	0.05	0.12
Totals			1,550,000	322,325	**0.806**	0.499	**1.247**

* Peak Flow = 2.5 x daily average flow

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Table 1A - Proposed Sewer Demand Table Line B

Land use/Zone Type	Daily Average Generation Factor	Units	Area(SF)/ Unit Contribution	Daily Average Flow (GPD)	Peak Flow* (MGD)	Daily Average Flow (CFS)	Peak Flow* (CFS)
Industrial/Bussiness Park	200	gal/1000 SF	157,000	31,400	0.08	0.05	0.12
Commercial	325	gal/1000 SF	14,000	4,550	0.01	0.01	0.02
Totals			171,000	35,950	**0.090**	0.056	**0.139**

* Peak Flow = 2.5 x daily average flow

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Table 1 B - Proposed Sewer Demand Table Line A

Land use/Zone Type	Daily Average Generation Factor	Units	Area(SF)/ Unit Contribution	Daily Average Flow (GPD)	Peak Flow* (MGD)	Daily Average Flow (CFS)	Peak Flow* (CFS)
Industrial/Bussiness Park	200	gal/1000 SF	1,294,400	258,880	0.65	0.40	1.00
Commercial	325	gal/1000 SF	84,600	27,495	0.07	0.04	0.11
Totals			1,379,000	286,375	0.716	0.443	1.108

* Peak Flow = 2.5 x daily average flow

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Table 1 C - Proposed Sewer Demand LA Racing

Land use/Zone Type	Daily Average Generation Factor	Units	Unit Contribution (Seats)	Daily Average Flow (GPD)	Peak Flow* (MGD)	Daily Average Flow (CFS)	Peak Flow* (CFS)
LA Racing	10	gal/Seat	6,000	60,000	0.15	0.09	0.23
Totals			6,000	60,000	**0.15**	0.09	**0.23**

* Peak Flow = 2.5 x daily average flow

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TABLE 2 - SEWER CAPACITY SUMMARY

Pipe Segment	Contributing Areas	Pipe Diameter [Inches]	Pipe Slope	Pipe Capacity [CFS]	Area Contributing Flow [CFS]	Cummulative Contributing Flow [CFS]	Cumulative Contributing Flow [MGD]	Capacity?	Normal Depth [FT]	Depth?	Velocity [FT/S]	Velocity?
LINE A	Portion (88.8%) of Park @ Live Oak *	15	0.30%	1.72	1.11	1.11	0.72	SUFFICIENT	0.49	SUFFICIENT	2.47	SUFFICIENT
	LA Racing	15	0.30%	1.72	0.23	1.34	0.87	SUFFICIENT	0.54	SUFFICIENT	2.61	SUFFICIENT
	Sub Total	15	0.30%	1.72	1.34	**1.34**	**0.87**	SUFFICIENT	0.60	SUFFICIENT	2.74	SUFFICIENT
LINE B	Assessor Maps	15	0.63%	2.96	1.99	1.99	1.29	SUFFICIENT	0.55	SUFFICIENT	3.82	SUFFICIENT
	Portion (11.2%) of Park @ Live Oak *	15	0.63%	2.96	0.14	2.13	1.38	SUFFICIENT	0.53	SUFFICIENT	3.85	SUFFICIENT
	Sub Total	15	0.63%	2.69	2.13	**2.13**	**1.38**	SUFFICIENT	0.53	SUFFICIENT	3.85	SUFFICIENT
LINE C*	Line A & Line B	20	0.16%	5.08	3.47	3.47	2.24	SUFFICIENT	0.75	SUFFICIENT	2.72	SUFFICIENT
	Assessor Maps	20	0.16%	5.08	0.80	4.27	2.76	SUFFICIENT	0.83	SUFFICIENT	2.80	SUFFICIENT
	Sub Total	20	0.16%	5.08	4.27	**4.27**	**2.76**	SUFFICIENT	0.90	SUFFICIENT	2.80	SUFFICIENT
LINE D	Assessor Maps	12	0.40%	1.07	1.05	**1.05**	**0.68**	SUFFICIENT	0.49	SUFFICIENT	2.72	SUFFICIENT
LINE E*	LINE C + LINE D	20	0.16%	6.00*	5.32	**5.32**	**3.44**	SUFFICIENT	1.30	SUFFICIENT	2.82	SUFFICIENT

* DISCHARGE FOR THIS PIPE SEGMENT SEGMENT IS 78.4% FULL, WHICH IS APPROXIMATELY 105% OF THE DESIGN CAPACITY. THIS IS BASED ON LA COUNTY'S DEFINITION OF 100% DESIGN CAPACITY BEING REACHED AT 75% FULL PIPE. HOWEVER, PER LOS ANGELES COUNTY POLICIES FOR MANAGING AVAILABLE SEWER CAPACITY AND SEWAGE DISCHARGE IN EXCESS OF DESIGN CAPACITY, NO FLOW MEASUREMENTS AND NO MITIGATION WILL BE REQUIRED. REFER TO APPENDIX B FOR MEMO FROMLA COUNTY.

Figures

Figure 1 — Vicinity Map

Figure 2 — Sewer Capacity Summary

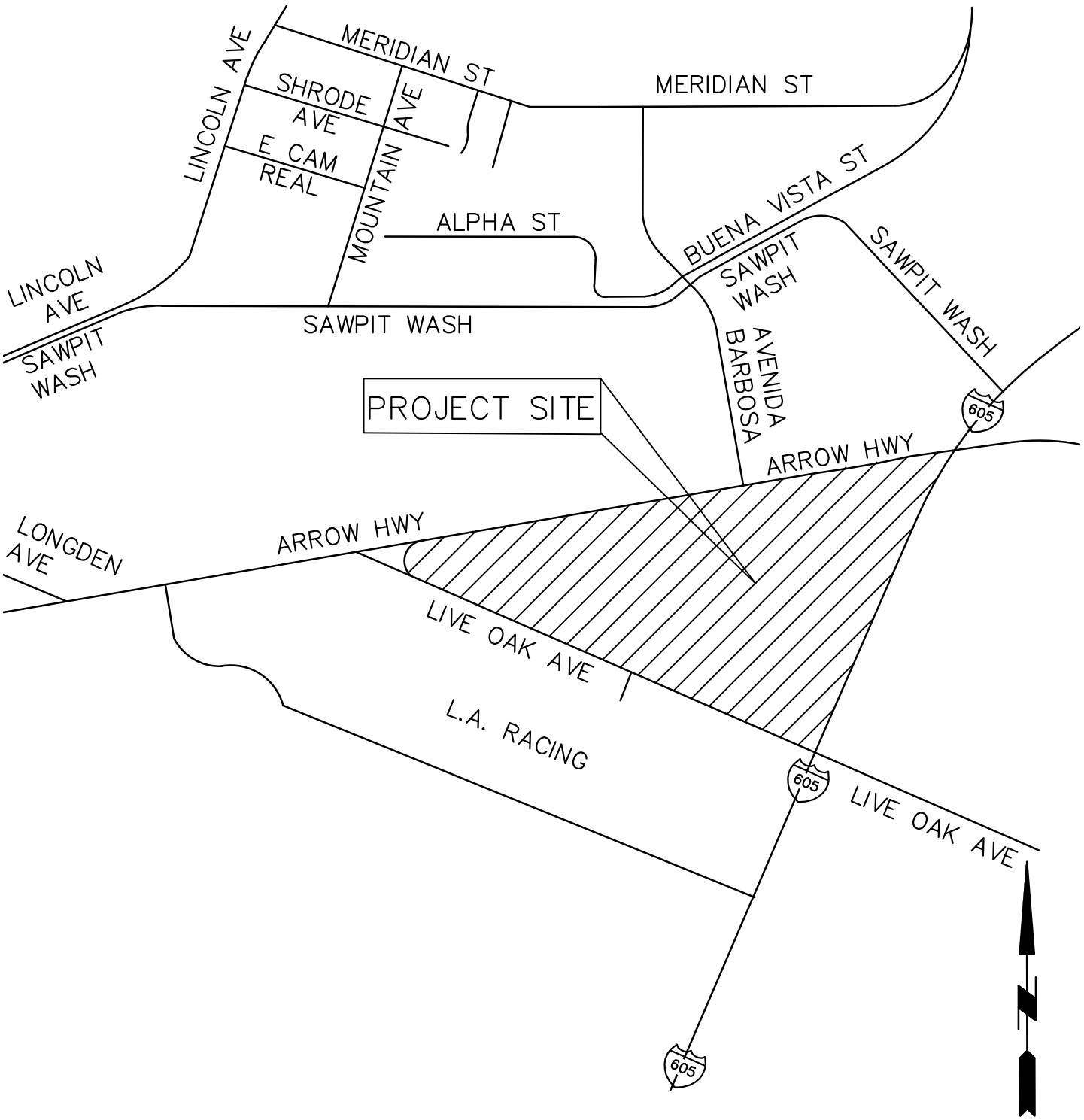


FIGURE 1

D & D ENGINEERING, INC.
8901 S. LA CIENEGA BLVD, SUITE 106
INGLEWOOD, CA 90301
Phone: 424-393-4122

THE PARK @ LIVE OAK

VICINITY MAP

SCALE: NTS
DATE: 03/23/18
SHT NO.: 1 OF 1

Drawing Name: M:\17015\Eng\17015\17015\Exhibits\04_Vicinity Map\Vicinity map.dwg
Last Opened: Mar 23, 2018 - 5:33pm by: Boris

811 Know what's below. Call before you dig.

CALL 811
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

LEGEND

EXISTING PUBLIC SEWER MAIN
PROPOSED 6"–8" PRIVATE SEWER
POINT OF CONNECTION

300 0 300 600
scale 1"= 300' feet

D & D ENGINEERING, INC.
8901 S. LA CIENEGA BLVD, SUITE 106
INGLEWOOD, CA 90301
Phone: 424-393-4122

THE PARK @ LIVE OAK

SEWER SYSTEM EXHIBIT

SCALE: 1" = 300'
DATE: 03/13/18
SHT NO.: 1 OF 1

Drawing Name: M: \17015\Admin\17015\Reports\Sewer Area Study\Figures\Sewer System Exhibit.dwg
Last Opened: May 14, 2018 4:43pm by: Boris

Appendix A

Estimated Average Daily Sewer Flows for Various Occupancies

TABLE 1

LOADINGS FOR EACH CLASS OF LAND USE

DESCRIPTION	UNIT OF MEASURE	FLOW (Gallons Per Day)	COD (Pounds Per Day)	SUSPENDED SOLIDS (Pounds Per Day)
R E S I D E N T I A L				
Single Family Home	Parcel	260	1.22	0.59
Duplex	Parcel	312	1.46	0.70
Triplex	Parcel	468	2.19	1.05
Fourplex	Parcel	624	2.92	1.40
Condominiums	Parcel	195	0.92	0.44
Single Family Home (reduced rate)	Parcel	156	0.73	0.35
Five Units or More	No. of Dwlg. Units	156	0.73	0.35
Mobile Home Parks	No. of Spaces	156	0.73	0.35
C O M M E R C I A L				
Hotel/Motel/Rooming House	Room	125	0.54	0.28
Store	1000 ft^2	100	0.43	0.23
Supermarket	1000 ft^2	150	2.00	1.00
Shopping Center	1000 ft^2	325	3.00	1.17
Regional Mall	1000 ft^2	150	2.10	0.77
Office Building	1000 ft^2	200	0.86	0.45
Professional Building	1000 ft^2	300	1.29	0.68
Restaurant	1000 ft^2	1,000	16.68	5.00
Indoor Theatre	1000 ft^2	125	0.54	0.28
Car Wash				
Tunnel - No Recycling	1000 ft^2	3,700	15.86	8.33
Tunnel - Recycling	1000 ft^2	2,700	11.74	6.16
Wand	1000 ft^2	700	3.00	1.58
Financial Institution	1000 ft^2	100	0.43	0.23
Service Shop	1000 ft^2	100	0.43	0.23
Animal Kennels	1000 ft^2	100	0.43	0.23
Service Station	1000 ft^2	100	0.43	0.23
Auto Sales/Repair	1000 ft^2	100	0.43	0.23
Wholesale Outlet	1000 ft^2	100	0.43	0.23
Nursery/Greenhouse	1000 ft^2	25	0.11	0.06
Manufacturing	1000 ft^2	200	1.86	0.70
Dry Manufacturing	1000 ft^2	25	0.23	0.09
Lumber Yard	1000 ft^2	25	0.23	0.09
Warehousing	1000 ft^2	25	0.23	0.09
Open Storage	1000 ft^2	25	0.23	0.09
Drive-in Theatre	1000 ft^2	20	0.09	0.05

TABLE 1
(continued)
LOADINGS FOR EACH CLASS OF LAND USE

DESCRIPTION	UNIT OF MEASURE	FLOW (Gallons Per Day)	COD (Pounds Per Day)	SUSPENDED SOLIDS (Pounds Per Day)
C O M M E R C I A L				
Night Club	1000 ft^2	350	1.50	0.79
Bowling/Skating	1000 ft^2	150	1.76	0.55
Club	1000 ft^2	125	0.54	0.27
Auditorium, Amusement	1000 ft^2	350	1.50	0.79
Golf Course, Camp, and Park (Structures and Improvements	1000 ft^2	100	0.43	0.23
Recreational Vehicle Park	No. of Spaces	55	0.34	0.14
Convalescent Home	Bed	125	0.54	0.28
Laundry	1000 ft^2	3,825	16.40	8.61
Mortuary/Cemetery	1000 ft^2	100	1.33	0.67
Health Spa, Gymnasium				
With Showers	1000 ft^2	600	2.58	1.35
Without Showers	1000 ft^2	300	1.29	0.68
Convention Center, Fairground, Racetrack, Sports Stadium/Arena	Average Daily Attendance	10	0.04	0.02
I N S T I T U T I O N A L				
College/University	Student	20	0.09	0.05
Private School	1000 ft^2	200	0.86	0.45
Church	1000 ft^2	50	0.21	0.11

Appendix B

- Will Serve Letter from the County Sanitation District dated May 1, 2018

- Policies for Managing Available Sewer Capacity and Sewage Discharge in Excess of Design Capacity

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

1955 Workman Mill Road, Whittier, CA 90601-1400
Mailing Address: P.O. Box 4998, Whittier, CA 90607-4998
Telephone: (562) 699-7411, FAX: (562) 699-5422
www.lacsd.org

GRACE ROBINSON HYDE
Chief Engineer and General Manager

May 1, 2018

Ref. Doc. No.: 4519356

CITY OF IRWINDALE
COMMUNITY DEVELOPMENT
MAY 02 2018
RECEIVED

Ms. Marilyn Simpson, AICP
Community Development Manager
Planning Division
City of Irwindale
5050 North Irwindale Avenue
Irwindale, CA 91706

Dear Ms. Simpson:

NOP Response for The Park @ Live Oak Specific Plan Project

The Sanitation Districts of Los Angeles County (Districts) received a Notice of Preparation of a Draft Environmental Impact Report (NOP) for the subject project on April 4, 2018. The proposed project is located within the jurisdictional boundaries of District No. 22. We offer the following comments regarding sewerage service:

1. The wastewater flow originating from the proposed project will discharge to a local sewer line, which is not maintained by the Districts, for conveyance to the Districts' Joint Outfall B Unit 8G Trunk Sewer, located in Live Oak Avenue at Myrtle Avenue. The Districts' 21-inch diameter trunk sewer has a capacity of 4.2 million gallons per day (mgd) and conveyed a peak flow of 1.5 mgd when last measured in 2012.

2. The wastewater generated by the proposed project will be treated at the San Jose Creek Water Reclamation Plant (WRP) located adjacent to the City of Industry, which has a capacity of 100 mgd and currently processes an average flow of 64.1 mgd. All biosolids and wastewater flows that exceed the capacity of the San Jose Creek WRP are diverted to and treated at the Joint Water Pollution Control Plant in the City of Carson.

3. The expected average wastewater flow from the project, described in the document as a 1,451,400-square-foot mixed-use industrial and commercial park, is 471,705 gallons per day. For a copy of the Districts' average wastewater generation factors, go to www.lacsd.org, Wastewater & Sewer Systems, click on Will Serve Program, and click on the Table 1, Loadings for Each Class of Land Use link.

4. The Districts are empowered by the California Health and Safety Code to charge a fee for the privilege of connecting (directly or indirectly) to the Districts' Sewerage System for increasing the strength or quantity of wastewater discharged from connected facilities. This connection fee is a capital facilities fee that is imposed in an amount sufficient to construct an incremental expansion of the Sewerage System to accommodate the proposed project. Payment of a

connection fee will be required before a permit to connect to the sewer is issued. For more information and a copy of the Connection Fee Information Sheet, go to www.lacsd.org, Wastewater & Sewer Systems, click on Will Serve Program, and search for the appropriate link. In determining the impact to the Sewerage System and applicable connection fees, the Districts' Chief Engineer and General Manager will determine the user category (e.g. Condominium, Single Family home, etc.) that best represents the actual or anticipated use of the parcel or facilities on the parcel. For more specific information regarding the connection fee application procedure and fees, please contact the Connection Fee Counter at (562) 908-4288, extension 2727.

5. In order for the Districts to conform to the requirements of the Federal Clean Air Act (CAA), the capacities of the Districts' wastewater treatment facilities are based on the regional growth forecast adopted by the Southern California Association of Governments (SCAG). Specific policies included in the development of the SCAG regional growth forecast are incorporated into clean air plans, which are prepared by the South Coast and Antelope Valley Air Quality Management Districts in order to improve air quality in the South Coast and Mojave Desert Air Basins as mandated by the CCA. All expansions of Districts' facilities must be sized and service phased in a manner that will be consistent with the SCAG regional growth forecast for the counties of Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial. The available capacity of the Districts' treatment facilities will, therefore, be limited to levels associated with the approved growth identified by SCAG. As such, this letter does not constitute a guarantee of wastewater service, but is to advise you that the Districts intend to provide this service up to the levels that are legally permitted and to inform you of the currently existing capacity and any proposed expansion of the Districts' facilities.

If you have any questions, please contact the undersigned at (562) 908-4288, extension 2717.

Very truly yours,

Adriana Raza
Customer Service Specialist
Facilities Planning Department

AR:ar

cc: A. Schmidt
M. Tatalovich

DOC: #4563864.D22

October 12, 2005

Approved

TO: Dean Efstathiou

FROM: Dennis Hunter
Land Development Division

POLICIES FOR MANAGING AVAILABLE SEWER CAPACITY AND SEWAGE DISCHARGE IN EXCESS OF DESIGN CAPACITY

The following will set forth Public Works' policies related to managing sewer infrastructure capacity. Design capacity of the sewer mainline is defined as follows:

< 15" diameter	½ full = 100% capacity (d/D)
≥ 15" diameter	¾ full = 100% capacity (d/D)

When Public Works determines there is available capacity in a mainline sewer for infill and redevelopment projects, the remaining available capacity shall be allocated on a first come – first serve basis.

Sewer Advisory Committee

A Sewer Advisory Committee (SAC) will be formed for the purpose of recommending courses of action to address proposed development connecting to existing sewers that will cause them to be operating beyond their design capacity. The SAC will make their recommendations to Dean Efstathiou, Assistant Director. The SAC will be chaired by Waterworks and Sewer Maintenance Division and will have representatives from Design and Land Development Divisions. Each Division will appoint a Principal Engineer or Senior Civil Engineer as a representative to the SAC and will convene whenever sewer decisions are required to address developmental impacts. Sewer Maintenance will maintain records of SAC meetings and will prepare recommendations to Administration for approval. The SAC may require other Division representatives to participate on a case-by-case basis when necessary, such as Building and Safety and Programs Development.

Divisional Responsibilities

Design Division

1. Support activities of the SAC.

2. Prepare sewer area studies when required.

3. Maintain records/archive of all approved sewer area studies and flow measurements.

Land Development Division

1. Support activities of the SAC.

2. Impose sewer area study requirements for private developments if necessary and review/approve all submittals.

3. Refer cases to SAC when both sewer area studies and flow measurements indicate that a potential overload situation exists or will exist based on criteria described below.

4. Provide copies of all approved sewer area studies and flow measurements to Design Division for archiving.

Waterworks and Sewer Maintenance Division

1. Chair the SAC, maintain meeting records and prepare position papers to Administration.

2. Advise the SAC when an overload condition is observed during maintenance activities.

3. Initiate effort to track and map all overload areas within the Consolidated Maintenance District.

4. Keep database of all flow measurement results.

Design Criteria

1. Capacity of sewer mainlines less than 15" in diameter are considered full (100 percent) when the ratio of the depth of flow (d) over the pipe diameter (D) is equal to 0.5, expressed as d/D = 0.5.

2. Capacity of sewer mainlines equal to or greater than 15" in diameter are considered full (100 percent) when the ratio of the depth of flow (d) over the pipe diameter (D) is equal to 0.75, expressed as d/D = 0.75.

3. When an area study indicates that flow conditions based on calculated discharges is between 101 percent to 150 percent of capacity, no flow measurements and no mitigation will be required. If maintenance records warrant, a flow test may be required.

4. When an area study for a development that proposes to increase the density or change the zoning indicates that flow conditions are between 151 to 200 percent of capacity, flow measurements shall be required. If the flow test indicates that the actual flow condition is below 151 percent, no mitigation will be required. If the flow test results indicate the actual flow is above 151 percent, the case shall be referred to the SAC to evaluate options and make recommendations to Administration for approval. These options may include, but are not limited to: requiring full mitigation from the development, assessing pro-rata shares, creation of a reimbursement district, or establishing a County Improvement (CI) district.

AHN:ca
P:\LDPUB\SUBPCHECK\SEWER\MISCELLANEOUS\SEWER INFRASTRUCTURE MANAGEMENT

cc: Administration (Kelly)
Building and Safety (Patel)
Design (Kumar)
Land Development (D'Antonio, Burger, Ruiz, Chong, Witler, Narag)
Programs Development (Afshari)
Waterworks and Sewer Maintenance (Del Real, Lehto)

Appendix C

Pipe Size Capacity Calculations

Worksheet for Line A, S=0.3%, 1/2 full

Project Description

Friction Method	Kutter Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00300	ft/ft
Normal Depth	0.63	ft
Diameter	1.25	ft

Results

Discharge	1.72	ft^3/s
Flow Area	0.61	ft^2
Wetted Perimeter	1.96	ft
Hydraulic Radius	0.31	ft
Top Width	1.25	ft
Critical Depth	0.52	ft
Percent Full	50.0	%
Critical Slope	0.00581	ft/ft
Velocity	2.80	ft/s
Velocity Head	0.12	ft
Specific Energy	0.75	ft
Froude Number	0.70	
Maximum Discharge	3.74	ft^3/s
Discharge Full	3.43	ft^3/s
Slope Full	0.00077	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	50.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line A, S=0.3%, 1/2 full

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.63	ft
Critical Depth	0.52	ft
Channel Slope	0.00300	ft/ft
Critical Slope	0.00581	ft/ft

Worksheet for Line A, S=0.3%, Q=1.475

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00300	ft/ft
Diameter	1.25	ft
Discharge	1.11	ft³/s

Results

Normal Depth	0.49	ft
Flow Area	0.45	ft²
Wetted Perimeter	1.70	ft
Hydraulic Radius	0.26	ft
Top Width	1.22	ft
Critical Depth	0.41	ft
Percent Full	39.4	%
Critical Slope	0.00584	ft/ft
Velocity	2.47	ft/s
Velocity Head	0.09	ft
Specific Energy	0.59	ft
Froude Number	0.72	
Maximum Discharge	3.74	ft³/s
Discharge Full	3.43	ft³/s
Slope Full	0.00034	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	39.41	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line A, S=0.3%, Q=1.475

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.49	ft
Critical Depth	0.41	ft
Channel Slope	0.00300	ft/ft
Critical Slope	0.00584	ft/ft

Worksheet for Line A, S=0.3%, Q=2.03

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00300	ft/ft
Diameter	1.25	ft
Discharge	1.34	ft³/s

Results

Normal Depth	0.54	ft
Flow Area	0.51	ft²
Wetted Perimeter	1.80	ft
Hydraulic Radius	0.28	ft
Top Width	1.24	ft
Critical Depth	0.46	ft
Percent Full	43.6	%
Critical Slope	0.00580	ft/ft
Velocity	2.61	ft/s
Velocity Head	0.11	ft
Specific Energy	0.65	ft
Froude Number	0.71	
Maximum Discharge	3.74	ft³/s
Discharge Full	3.43	ft³/s
Slope Full	0.00049	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	43.59	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line A, S=0.3%, Q=2.03

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.54	ft
Critical Depth	0.46	ft
Channel Slope	0.00300	ft/ft
Critical Slope	0.00580	ft/ft

Worksheet for Line B, S=0.63%,3/4 full

Project Description

Friction Method	Kutter Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00630	ft/ft
Normal Depth	0.63	ft
Diameter	1.50	ft

Results

Discharge	2.96	ft^3/s
Flow Area	0.70	ft^2
Wetted Perimeter	2.11	ft
Hydraulic Radius	0.33	ft
Top Width	1.48	ft
Critical Depth	0.65	ft
Percent Full	41.7	%
Critical Slope	0.00533	ft/ft
Velocity	4.25	ft/s
Velocity Head	0.28	ft
Specific Energy	0.91	ft
Froude Number	1.09	
Maximum Discharge	8.94	ft^3/s
Discharge Full	8.23	ft^3/s
Slope Full	0.00084	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	41.67	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line B, S=0.63%,3/4 full

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.63	ft
Critical Depth	0.65	ft
Channel Slope	0.00630	ft/ft
Critical Slope	0.00533	ft/ft

Worksheet for Line B, S=0.63%,Q=1.99

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00630	ft/ft
Diameter	1.25	ft
Discharge	1.99	ft³/s

Results

Normal Depth	0.55	ft
Flow Area	0.52	ft²
Wetted Perimeter	1.82	ft
Hydraulic Radius	0.29	ft
Top Width	1.24	ft
Critical Depth	0.56	ft
Percent Full	44.1	%
Critical Slope	0.00585	ft/ft
Velocity	3.82	ft/s
Velocity Head	0.23	ft
Specific Energy	0.78	ft
Froude Number	1.04	
Maximum Discharge	5.43	ft³/s
Discharge Full	4.99	ft³/s
Slope Full	0.00103	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	44.09	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line B, S=0.63%,Q=1.99

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.55	ft
Critical Depth	0.56	ft
Channel Slope	0.00630	ft/ft
Critical Slope	0.00585	ft/ft

Worksheet for Line B, S=0.63%,Q=2.13

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00630	ft/ft
Diameter	1.50	ft
Discharge	2.13	ft³/s

Results

Normal Depth	0.53	ft
Flow Area	0.55	ft²
Wetted Perimeter	1.90	ft
Hydraulic Radius	0.29	ft
Top Width	1.43	ft
Critical Depth	0.55	ft
Percent Full	35.1	%
Critical Slope	0.00528	ft/ft
Velocity	3.85	ft/s
Velocity Head	0.23	ft
Specific Energy	0.76	ft
Froude Number	1.09	
Maximum Discharge	8.94	ft³/s
Discharge Full	8.23	ft³/s
Slope Full	0.00045	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	35.08	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line B, S=0.63%,Q=2.13

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.53	ft
Critical Depth	0.55	ft
Channel Slope	0.00630	ft/ft
Critical Slope	0.00528	ft/ft

Worksheet for Line C -20 ", S=0.16%,3/4 full

Project Description

Friction Method	Kutter Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00160	ft/ft
Normal Depth	1.25	ft
Diameter	1.67	ft

Results

Discharge	5.08	ft^3/s
Flow Area	1.76	ft^2
Wetted Perimeter	3.49	ft
Hydraulic Radius	0.50	ft
Top Width	1.45	ft
Critical Depth	0.84	ft
Percent Full	74.9	%
Critical Slope	0.00525	ft/ft
Velocity	2.89	ft/s
Velocity Head	0.13	ft
Specific Energy	1.38	ft
Froude Number	0.46	
Maximum Discharge	5.99	ft^3/s
Discharge Full	5.52	ft^3/s
Slope Full	0.00136	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	74.85	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line C -20 ", S=0.16%,3/4 full

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.25	ft
Critical Depth	0.84	ft
Channel Slope	0.00160	ft/ft
Critical Slope	0.00525	ft/ft

Worksheet for Line C -20 ", S=0.16% full flow

Project Description

Friction Method	Kutter Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00160	ft/ft
Normal Depth	1.56	ft
Diameter	1.67	ft

Results

Discharge	6.00	ft^3/s
Flow Area	2.13	ft^2
Wetted Perimeter	4.38	ft
Hydraulic Radius	0.49	ft
Top Width	0.83	ft
Critical Depth	0.92	ft
Percent Full	93.4	%
Critical Slope	0.00545	ft/ft
Velocity	2.82	ft/s
Velocity Head	0.12	ft
Specific Energy	1.68	ft
Froude Number	0.31	
Maximum Discharge	5.99	ft^3/s
Discharge Full	5.52	ft^3/s
Slope Full	0.00188	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	93.41	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line C -20 ", S=0.16% full flow

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.56	ft
Critical Depth	0.92	ft
Channel Slope	0.00160	ft/ft
Critical Slope	0.00545	ft/ft

Worksheet for Line C, S=0.16%,Q=3.74

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00160	ft/ft
Diameter	1.67	ft
Discharge	3.74	ft³/s

Results

Normal Depth	1.00	ft
Flow Area	1.37	ft²
Wetted Perimeter	2.96	ft
Hydraulic Radius	0.46	ft
Top Width	1.64	ft
Critical Depth	0.71	ft
Percent Full	60.1	%
Critical Slope	0.00506	ft/ft
Velocity	2.72	ft/s
Velocity Head	0.12	ft
Specific Energy	1.12	ft
Froude Number	0.52	
Maximum Discharge	5.99	ft³/s
Discharge Full	5.52	ft³/s
Slope Full	0.00075	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	60.06	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line C, S=0.16%,Q=3.74

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.00	ft
Critical Depth	0.71	ft
Channel Slope	0.00160	ft/ft
Critical Slope	0.00506	ft/ft

Worksheet for Line C, S=0.16%,Q=4.27

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00160	ft/ft
Diameter	1.67	ft
Discharge	4.27	ft³/s

Results

Normal Depth	1.10	ft
Flow Area	1.52	ft²
Wetted Perimeter	3.15	ft
Hydraulic Radius	0.48	ft
Top Width	1.59	ft
Critical Depth	0.77	ft
Percent Full	65.6	%
Critical Slope	0.00511	ft/ft
Velocity	2.80	ft/s
Velocity Head	0.12	ft
Specific Energy	1.22	ft
Froude Number	0.50	
Maximum Discharge	5.99	ft³/s
Discharge Full	5.52	ft³/s
Slope Full	0.00097	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	65.60	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line C, S=0.16%,Q=4.27

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.10	ft
Critical Depth	0.77	ft
Channel Slope	0.00160	ft/ft
Critical Slope	0.00511	ft/ft

Worksheet for Line C, S=0.4%,Q=4.54

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00400	ft/ft
Diameter	1.75	ft
Discharge	4.54	ft³/s

Results

Normal Depth	0.83	ft
Flow Area	1.12	ft²
Wetted Perimeter	2.66	ft
Hydraulic Radius	0.42	ft
Top Width	1.75	ft
Critical Depth	0.78	ft
Percent Full	47.4	%
Critical Slope	0.00498	ft/ft
Velocity	4.04	ft/s
Velocity Head	0.25	ft
Specific Energy	1.08	ft
Froude Number	0.89	
Maximum Discharge	10.82	ft³/s
Discharge Full	9.98	ft³/s
Slope Full	0.00085	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	47.39	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line C, S=0.4%,Q=4.54

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.83	ft
Critical Depth	0.78	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.00498	ft/ft

Worksheet for Line D, S=0.4%,1/2 full

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00400	ft/ft
Diameter	1.00	ft
Discharge	1.05	ft³/s

Results

Normal Depth	0.49	ft
Flow Area	0.39	ft²
Wetted Perimeter	1.56	ft
Hydraulic Radius	0.25	ft
Top Width	1.00	ft
Critical Depth	0.43	ft
Percent Full	49.4	%
Critical Slope	0.00653	ft/ft
Velocity	2.72	ft/s
Velocity Head	0.11	ft
Specific Energy	0.61	ft
Froude Number	0.77	
Maximum Discharge	2.34	ft³/s
Discharge Full	2.15	ft³/s
Slope Full	0.00098	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	49.35	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line D, S=0.4%,1/2 full

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.49	ft
Critical Depth	0.43	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.00653	ft/ft

Worksheet for Line E, S=0.4%, Q=5.45

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00400	ft/ft
Diameter	1.75	ft
Discharge	9.06	ft³/s

Results

Normal Depth	1.30	ft
Flow Area	1.91	ft²
Wetted Perimeter	3.63	ft
Hydraulic Radius	0.53	ft
Top Width	1.53	ft
Critical Depth	1.12	ft
Percent Full	74.1	%
Critical Slope	0.00594	ft/ft
Velocity	4.74	ft/s
Velocity Head	0.35	ft
Specific Energy	1.65	ft
Froude Number	0.75	
Maximum Discharge	10.82	ft³/s
Discharge Full	9.98	ft³/s
Slope Full	0.00331	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	74.10	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line E, S=0.4%, Q=5.45

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.30	ft
Critical Depth	1.12	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.00594	ft/ft

Worksheet for Line E, S=0.16%,Q=5.32

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00160	ft/ft
Diameter	1.67	ft
Discharge	5.32	ft³/s

Results

Normal Depth	1.31	ft
Flow Area	1.83	ft²
Wetted Perimeter	3.62	ft
Hydraulic Radius	0.51	ft
Top Width	1.37	ft
Critical Depth	0.86	ft
Percent Full	78.4	%
Critical Slope	0.00531	ft/ft
Velocity	2.90	ft/s
Velocity Head	0.13	ft
Specific Energy	1.44	ft
Froude Number	0.44	
Maximum Discharge	5.96	ft³/s
Discharge Full	5.49	ft³/s
Slope Full	0.00150	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	78.38	%
Downstream Velocity	Infinity	ft/s

Worksheet for Line E, S=0.16%,Q=5.32

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.31	ft
Critical Depth	0.86	ft
Channel Slope	0.00160	ft/ft
Critical Slope	0.00531	ft/ft

8901 S. La Cienega Blvd, Suite 106 | Inglewood, CA 90301| 424.351.6800

D & D ENGINEERING, INC.

Appendix D

Sewer Area Study Arrow Pit Development
dated June 2017

DAVID EVANS AND ASSOCIATES INC.

17782 17th Street, Suite 200, Tustin, California 92780
Telephone: (714) 665-4500 ◆ FAX: (714) 665-4501 ◆ website: www.deainc.com

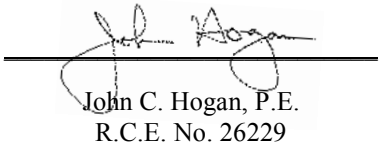
SEWER AREA STUDY

Arrow Pit
Development

Irwindale, CA

Prepared for:
Irwindale Partners 2
510 E Foothill Blvd, Suite 206
San Dimas, CA 91773

Prepared under the Supervision of:



John C. Hogan, P.E.
R.C.E. No. 26229

March 16th, 2017
(revised June 2017)

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1. PROJECT DESCRIPTION

The existing 77-acre quarry site sits in the triangular area bounded by Arrow Highway to the north, Live Oak Ave to the south, and the 605 Freeway to the east. The site is currently being filled to rough graded condition and will ultimately be developed as a mixed-use facility consisting of warehouse, retail, and restaurant space. See Appendix A for project site plan. The project site currently does not discharge into the City of Irwindale's sewer system.

2. PURPOSE OF STUDY

The following study was prepared to determine if the existing sanitary sewer main in Live Oak Ave has the capacity to accept the flows from the proposed Arrow Pit Development Project. The expected flows from the proposed development will be compared to the assumed flows from the original sewer design. Our study also revises the original sewer design calculations to utilize Kutter's Formula and the updated pipe capacity requirements discussed further below.

3. ORIGINAL SEWER DESIGN FLOWS

The original design of the Live Oak Sewer was performed by Kenneth Mullen, Consulting Engineers (See **Appendix D**). In the study "LA Marketplace – Sewer main Design Live Oak Ave", the assumed tributary areas to the sewer main in Live Oak Ave between Arrow Highway and the 605 Freeway included the Arrow Pit site. The assumed flow that was used at the time for all of the tributary areas was 80 gpd/1,000 SF and the calculated daily flow rate for the Arrow Pit site was 0.39 cfs. These numbers were based on a theoretical future land use consisting of warehouse, office buildings, and restaurant space. The assumed flows from the Arrow Pit site and the LA Marketplace (now the Irwindale Speedway) resulted in calculations showing that a minimum 12" pipe was needed at 0.4% slope. The calculations utilized Manning's Equation to determine the required pipe sizes. Per the record drawings (See **Appendix E**) a 15" pipe at 0.3% slope was built in Live Oak Ave.

4. PROPOSED DEVELOPMENT FLOWS

It is anticipated that the proposed Arrow Pit development will consist of 1.355 million SF of warehouse, 47,000 SF of retail space, and 33,000 SF of restaurants. Using the LA County Sanitation Districts (LACSD) generations tables, an average flow of 57.2 gpd/1,000 SF can be assumed for the area resulting in total daily flow rate of 0.13 cfs. Peak flow in each line was determined by multiplying the average daily flow rate of each pipe by the factor of 2.5 per LACSD. These calculations can be seen in **Appendix B** and in a summary **Table 1** and **Table 2** below. In order to obtain conservative values, the

retail space was calculated as a "Shopping Center" per the LACSD table, however it is more likely to generate flows closer to "Store" (225 gpd/1,000 SF less than "Shopping Center"). The LACSD generation table is attached in **Appendix C** for reference.

TABLE 1

TRIBUTARY AREA BY LAND USE				
	LACSD DESCRIPTION	**AREA SF**	**WILSRV LOADS GPD/1000SF**	**FLOW GPD**
Warehouse	Warehouse	1355000	25	33875
Retail	Shopping Center	47000	325	15275
Restaurants	Restaurant	33000	1000	33000
TOTAL	-	1435000	-	82150
-	**WEIGHTED AVG**	0.0572	GPD	-
-	-	57.2	GPD/1000SF	-
-	**AVG DAILY FLOW**	0.13	CFS	-

TABLE 2 – PEAK FLOW IN EACH PIPE LINE

	Q (CFS)	**Q_P (CFS)**	**NOTES**
LINE A	**0.53**	**1.32**	
LINE B	**0.80**	**1.99**	
LINE C	**1.64**	**4.11**	**$Q_A+Q_B+Q_C$**
LINE D	**0.42**	**1.04**	
LINE E	**2.06**	**5.15**	**$Q_{CT}+Q_D$**

5. SEWER PIPE CAPACITY ANALYSIS

Per the record drawings, a 15" pipe at 0.3% slope was built in Live Oak Avenue (See **Appendix E**). An updated sewer capacity analysis was done to revise the calculations utilizing Kutter's Formula and the requirement of pipe sizes greater than 15 inches to flow ¾ full and pipe sizes 15 inches and less to flow ½ full. Using Kutter's Formula in flowmaster, with 15" pipe, a slope of 0.003 ft/ft, a roughness coefficient of 0.013, and a peak flow of 1.32 cfs, the pipe was 43.2 percent full. The result shows that the existing 15" pipe has sufficient capacity to handle the discharge from the proposed Arrow Pit development. See **Appendix B** for the Flowmaster calculation results and a summary in **Table 3** below.

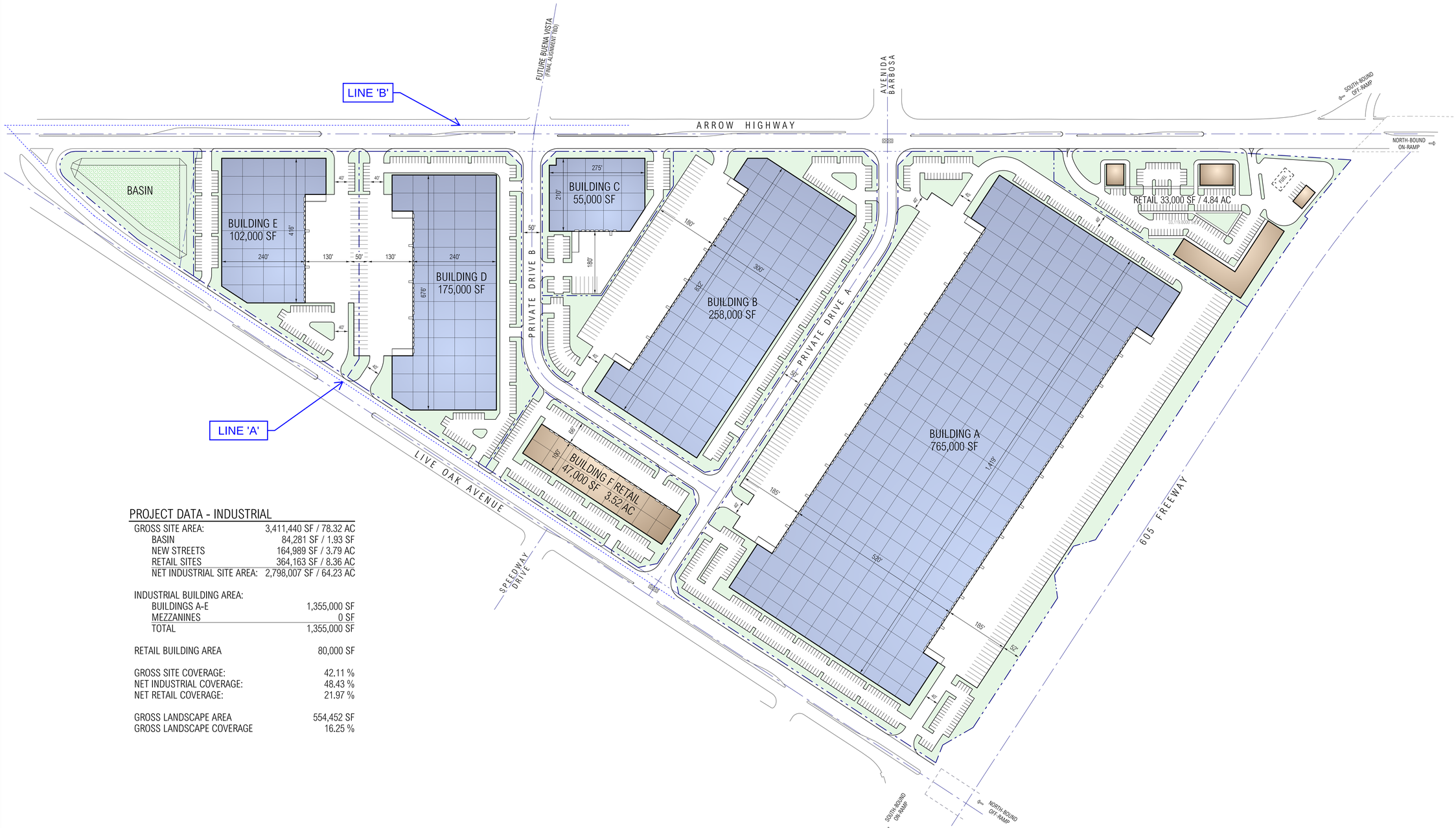
TABLE 3 – SEWER CAPACITY ANALYSIS SUMMARY

	Q_P (CFS)	PIPE (IN)	%FULL	EX PIPE (IN)	EX SLOPE (%)
LINE A	1.32	15	43.2	15	0.3
LINE B	1.99	18	38.1	-	-
LINE C	4.11	18	57.2	21	0.4
LINE D	1.04	12	49.1	-	-
LINE E	5.15	18	66.3	-	-

6. SUMMARY OF RESULTS

Our conservative flow estimate average of 57.2 gpd/1,000 SF is considerably less than the original assumed design flow average of 80 gpd/1,000 SF. Similarly, the anticipated total daily flow volume for the proposed Arrow Pit development is 3 times less (0.13 cfs vs 0.39 cfs) than what the City's sewer main was originally designed to accept from the 77-acre property. This is due to the conservative nature of the original design, which assumed that commercial buildings would cover the entire footprint of the tributary areas. Since our calculated flows are significantly lower than the original design, we conclude that there is sufficient capacity to handle the discharge from the proposed Arrow Pit development.

Proposed Arrow Pit
Site Plan



PROJECT DATA - INDUSTRIAL

GROSS SITE AREA:	3,411,440 SF / 78.32 AC
BASIN	84,281 SF / 1.93 SF
NEW STREETS	164,989 SF / 3.79 AC
RETAIL SITES	364,163 SF / 8.36 AC
NET INDUSTRIAL SITE AREA:	2,798,007 SF / 64.23 AC
INDUSTRIAL BUILDING AREA:	
BUILDINGS A-E	1,355,000 SF
MEZZANINES	0 SF
TOTAL	1,355,000 SF
RETAIL BUILDING AREA	80,000 SF
GROSS SITE COVERAGE:	42.11 %
NET INDUSTRIAL COVERAGE:	48.43 %
NET RETAIL COVERAGE:	21.97 %
GROSS LANDSCAPE AREA	554,452 SF
GROSS LANDSCAPE COVERAGE	16.25 %

MASTER SITE PLAN

SCALE: 1" = 100'-0"

0' 20' 50' 100' 200'

RGA
Office of Architectural Design
15231 Alton Parkway, Suite 100
Irvine, CA 92618
T 949-341-0920
FX 949-341-0922

CONSULTANT

PROFESSIONAL SEALS

ARROW BUSINESS CENTER

ARROW HIGHWAY
CITY OF IRWINDALE
CALIFORNIA

IRWINDALE PARTNERS, LP
11021 WINNERS CIRCLE, SUITE 200
LOS ALAMITOS, CA 90720
562.799.2366

MARK	DATE	DESCRIPTION
SD	04/17/2017	SCHEMATIC DESIGN
DD		
PC		
BID		
CD		

RGA PROJECT NO:	16152.00
OWNER PROJECT NO:	00000.00
CAD FILE NAME:	16152-00-A1-1E
DRAWN BY:	CF
CHK'D BY:	DR

SHEET TITLE
MASTER SITE PLAN

SHEET: A1-1

Proposed Arrow Pit Flow Calculations

DAVID EVANS AND ASSOCIATES INC.

JOB DESCRIPTION ARROW PIT
CALCULATION FOR AVERAGE FLOW CALCS

JN 100111
BY OEE/PTBD DATE 3/10/17 (REVISED 06/01/17)
SHEET 1 OF 1 SHEETS
CHECKED BY ____ DATE ____

LAND USE

1,355,000 SF – WAREHOUSE ——— $25\ gpd/1{,}000\ SF = 33{,}875\ gpd$

47,000 SF – RETAIL (SHOPPING CENTER) — $325\ gpd/1{,}000\ SF = 15{,}275\ gpd$

33,000 SF – RESTAURANT ——— $1{,}000\ gpd/1{,}000\ SF = 33{,}000\ gpd$

TOTAL = 82,150 gpd

WEIGHTED AVG

$$\frac{1{,}355{,}000\ SF\,(25\ gpd/1{,}000\ SF) + 47{,}000\ SF\,(325\ gpd/1{,}000\ SF) + 33{,}000\ SF\,(1{,}000\ gpd/1{,}000\ SF)}{1{,}355{,}000\ SF + 47{,}000\ SF + 33{,}000\ SF}$$

$= 57.2\ gpd/1{,}000\ SF$

ORIGINAL DESIGN ASSUMED $80\ gpd/1{,}000\ SF$ FOR TRIBUTARY AREAS

$80\ gpd/1000\ SF \times 43560\ SF/1\ AC \times 72.3\ Ac = 251{,}951\ gpd$

TOTAL FLOW

33,875 gpd + 15,275 gpd + 33,000 gpd = 82,150 gpd

$$82{,}150\ gpd \times \frac{1\ day}{24\ hr} \times \frac{1\ hr}{60\ min} \times \frac{1\ min}{60\ sec} \times \frac{1\ CF}{7.48\ gal}$$

$= 0.13\ cfs$ DAILY FLOW

ORIGINAL DESIGN ASSUMED 0.39 cfs DAILY FLOW FROM PROJECT SITE [72.3 Ac × 0.0054 cfs/Ac = 0.39 cfs]

TRIBUTARY AREA BY LAND USE				
	LACSD DESCRIPTION	**AREA SF**	**WILSRV LOADS GPD/1000SF**	**FLOW GPD**
Warehouse	Warehouse	1355000	25	33875
Retail	Shopping Center	47000	325	15275
Restaurants	Restaurant	33000	1000	33000
TOTAL	-	1435000	-	82150
-	**WEIGHTED AVG**	0.0572	GPD	-
-	-	57.2	GPD/1000SF	-
-	**AVG DAILY FLOW**	0.13	CFS	-

A. TRIBUTARY FLOWS						
LINE A	**LIVE OAK B/W ARROW HWY & SAN GABRIEL RIVER FWY**					
	AREA (AC)	**AVG Q (CFS)**				
ASSESSOR MAP	74.15	0.400				
PROJECT SITE	32.94	0.127				
TOTAL	107.093	0.528				
LINE B	**ARROW HWY B/W LIVE OAK AVE & SAN GABRIEL RIVER FWY**					
	AREA (AC)	**AVG Q (CFS)**				
ASSESSOR MAP	147.55	0.797				
PROJECT SITE	0.00	0.000				
TOTAL	147.550	0.797				
LINE C	**LIVE LOAK AVE FROM 550' EAST OF PECK ROAD TO ARROW HWY**					
	AREA (AC)	**AVG Q (CFS)**				
ASSESSOR MAP	58.98	0.318				
PROJECT SITE	0.00	0.000				
TOTAL	58.980	0.318				
LINE D	**EASEMENT S. OF LIVE OAK 550' EAST OF PECK ROAD**					
	AREA (AC)	**AVG Q (CFS)**				
ASSESSOR MAP	77.2	0.417				
PROJECT SITE	0.00	0.000				
TOTAL	77.200	0.417				
B. SIZE OF PIPELINES						
1. FLOWMASTER USED FOR CALCULATIONS						
	<15" PIPE	FLOW 1/2 FULL				
	>15" PIPE	FLOW 3/4 FULL				
2. PEAK FLOW IN EACH PIPELINE		MULTIPLY AVG Q BY 2.5 TO OBTAIN PEAK FLOW				
	Q (CFS)	**QP (CFS)**	**NOTES**			
LINE A	0.528	1.32				
LINE B	0.797	1.99				
LINE C	1.643	4.11	QA+QB+QC			
LINE D	0.417	1.04				
LINE E	2.060	5.15	QCT+QD			
3. DETERMINE PIPE SIZES						
n	0.013					
s	0.004	0.003 for LINE A				
Qp	See Table 2					
Diameter	variable to determine based on criteria:					
	<15" PIPE	FLOW 1/2 FULL	50%			
	>15" PIPE	FLOW 3/4 FULL	75%			
depth	variable to determine based on criteria:					
	<15" PIPE	FLOW 1/2 FULL	50%			
	>15" PIPE	FLOW 3/4 FULL	75%			
	Q_P (CFS)	**PIPE (IN)**	**%FULL**	**EX PIPE (IN)**	**EX SLOPE (%)**	
LINE A	1.32	15	43.2	15	0.3	
LINE B	1.99	18	38.1	-	-	
LINE C	4.11	18	57.2	21	0.4	
LINE D	1.04	12	49.1	-	-	
LINE E	5.15	18	66.3	-	-	
*SEE FLOWMASTER SHEETS FOR DETAILED INFORMATION						

LINE A - 15IN 43%

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00300	ft/ft
Diameter	15.00	in
Discharge	1.32	ft³/s

Results

Normal Depth	6.49	in
Flow Area	0.51	ft²
Wetted Perimeter	1.79	ft
Hydraulic Radius	3.40	in
Top Width	1.24	ft
Critical Depth	0.45	ft
Percent Full	43.2	%
Critical Slope	0.00580	ft/ft
Velocity	2.60	ft/s
Velocity Head	0.10	ft
Specific Energy	0.65	ft
Froude Number	0.71	
Maximum Discharge	3.74	ft³/s
Discharge Full	3.43	ft³/s
Slope Full	0.00047	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	43.24	%
Downstream Velocity	Infinity	ft/s

LINE A - 15IN 43%

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	6.49	in
Critical Depth	0.45	ft
Channel Slope	0.00300	ft/ft
Critical Slope	0.00580	ft/ft

LINE B - 18IN 38%

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00400	ft/ft
Diameter	18.00	in
Discharge	1.99	ft³/s

Results

Normal Depth	6.86	in
Flow Area	0.62	ft²
Wetted Perimeter	2.00	ft
Hydraulic Radius	3.72	in
Top Width	1.46	ft
Critical Depth	0.53	ft
Percent Full	38.1	%
Critical Slope	0.00527	ft/ft
Velocity	3.21	ft/s
Velocity Head	0.16	ft
Specific Energy	0.73	ft
Froude Number	0.87	
Maximum Discharge	7.11	ft³/s
Discharge Full	6.55	ft³/s
Slope Full	0.00040	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	38.13	%
Downstream Velocity	Infinity	ft/s

LINE B - 18IN 38%

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	6.86	in
Critical Depth	0.53	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.00527	ft/ft

LINE C - 18IN 57%

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00400	ft/ft
Diameter	18.00	in
Discharge	4.11	ft³/s

Results

Normal Depth	10.30	in
Flow Area	1.05	ft²
Wetted Perimeter	2.57	ft
Hydraulic Radius	4.88	in
Top Width	1.48	ft
Critical Depth	0.78	ft
Percent Full	57.2	%
Critical Slope	0.00559	ft/ft
Velocity	3.93	ft/s
Velocity Head	0.24	ft
Specific Energy	1.10	ft
Froude Number	0.83	
Maximum Discharge	7.11	ft³/s
Discharge Full	6.55	ft³/s
Slope Full	0.00160	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	57.25	%
Downstream Velocity	Infinity	ft/s

LINE C - 18IN 57%

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	10.30	in
Critical Depth	0.78	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.00559	ft/ft

LINE D - 12IN 49%

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00400	ft/ft
Diameter	12.00	in
Discharge	1.04	ft³/s

Results

Normal Depth	5.89	in
Flow Area	0.38	ft²
Wetted Perimeter	1.55	ft
Hydraulic Radius	2.96	in
Top Width	1.00	ft
Critical Depth	0.43	ft
Percent Full	49.1	%
Critical Slope	0.00655	ft/ft
Velocity	2.71	ft/s
Velocity Head	0.11	ft
Specific Energy	0.61	ft
Froude Number	0.77	
Maximum Discharge	2.34	ft³/s
Discharge Full	2.15	ft³/s
Slope Full	0.00097	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	49.09	%
Downstream Velocity	Infinity	ft/s

LINE D - 12IN 49%

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	5.89	in
Critical Depth	0.43	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.00655	ft/ft

LINE E - 18IN 66%

Project Description

Friction Method	Kutter Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00400	ft/ft
Diameter	18.00	in
Discharge	5.15	ft³/s

Results

Normal Depth	11.94	in
Flow Area	1.24	ft²
Wetted Perimeter	2.86	ft
Hydraulic Radius	5.23	in
Top Width	1.42	ft
Critical Depth	0.87	ft
Percent Full	66.3	%
Critical Slope	0.00592	ft/ft
Velocity	4.14	ft/s
Velocity Head	0.27	ft
Specific Energy	1.26	ft
Froude Number	0.78	
Maximum Discharge	7.11	ft³/s
Discharge Full	6.55	ft³/s
Slope Full	0.00249	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	66.35	%
Downstream Velocity	Infinity	ft/s

LINE E - 18IN 66%

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	11.94	in
Critical Depth	0.87	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.00592	ft/ft

LACSD Loadings for Each Class of Land Use

TABLE 1

LOADINGS FOR EACH CLASS OF LAND USE

DESCRIPTION	UNIT OF MEASURE	FLOW (Gallons Per Day)	COD (Pounds Per Day)	SUSPENDED SOLIDS (Pounds Per Day)
R E S I D E N T I A L				
Single Family Home	Parcel	260	1.22	0.59
Duplex	Parcel	312	1.46	0.70
Triplex	Parcel	468	2.19	1.05
Fourplex	Parcel	624	2.92	1.40
Condominiums	Parcel	195	0.92	0.44
Single Family Home (reduced rate)	Parcel	156	0.73	0.35
Five Units or More	No. of Dwlg. Units	156	0.73	0.35
Mobile Home Parks	No. of Spaces	156	0.73	0.35
C O M M E R C I A L				
Hotel/Motel/Rooming House	Room	125	0.54	0.28
Store	1000 ft^2	100	0.43	0.23
Supermarket	1000 ft^2	150	2.00	1.00
Shopping Center	1000 ft^2	325	3.00	1.17
Regional Mall	1000 ft^2	150	2.10	0.77
Office Building	1000 ft^2	200	0.86	0.45
Professional Building	1000 ft^2	300	1.29	0.68
Restaurant	1000 ft^2	1,000	16.68	5.00
Indoor Theatre	1000 ft^2	125	0.54	0.28
Car Wash				
Tunnel - No Recycling	1000 ft^2	3,700	15.86	8.33
Tunnel - Recycling	1000 ft^2	2,700	11.74	6.16
Wand	1000 ft^2	700	3.00	1.58
Financial Institution	1000 ft^2	100	0.43	0.23
Service Shop	1000 ft^2	100	0.43	0.23
Animal Kennels	1000 ft^2	100	0.43	0.23
Service Station	1000 ft^2	100	0.43	0.23
Auto Sales/Repair	1000 ft^2	100	0.43	0.23
Wholesale Outlet	1000 ft^2	100	0.43	0.23
Nursery/Greenhouse	1000 ft^2	25	0.11	0.06
Manufacturing	1000 ft^2	200	1.86	0.70
Dry Manufacturing	1000 ft^2	25	0.23	0.09
Lumber Yard	1000 ft^2	25	0.23	0.09
Warehousing	1000 ft^2	25	0.23	0.09
Open Storage	1000 ft^2	25	0.23	0.09
Drive-in Theatre	1000 ft^2	20	0.09	0.05

TABLE 1
(continued)
LOADINGS FOR EACH CLASS OF LAND USE

DESCRIPTION	UNIT OF MEASURE	FLOW (Gallons Per Day)	COD (Pounds Per Day)	SUSPENDED SOLIDS (Pounds Per Day)
C O M M E R C I A L				
Night Club	1000 ft^2	350	1.50	0.79
Bowling/Skating	1000 ft^2	150	1.76	0.55
Club	1000 ft^2	125	0.54	0.27
Auditorium, Amusement	1000 ft^2	350	1.50	0.79
Golf Course, Camp, and Park (Structures and Improvements	1000 ft^2	100	0.43	0.23
Recreational Vehicle Park	No. of Spaces	55	0.34	0.14
Convalescent Home	Bed	125	0.54	0.28
Laundry	1000 ft^2	3,825	16.40	8.61
Mortuary/Cemetery	1000 ft^2	100	1.33	0.67
Health Spa, Gymnasium				
With Showers	1000 ft^2	600	2.58	1.35
Without Showers	1000 ft^2	300	1.29	0.68
Convention Center, Fairground, Racetrack, Sports Stadium/Arena	Average Daily Attendance	10	0.04	0.02
I N S T I T U T I O N A L				
College/University	Student	20	0.09	0.05
Private School	1000 ft^2	200	0.86	0.45
Church	1000 ft^2	50	0.21	0.11

LA Marketplace Sewer Design Live Oak Study

DETERMINE SIZE OF PROPOSED SEWERMAIN REQUIRED TO SERVE ENTIRE TRIBUTARY AREA (SEE ATTACHED MAP)

DESIGN CRITERIA:

MIN. PIPE SIZE = 8" MIN. VELOCITY = 2fps
PIPELINE FLOWING 1/2 FULL FOR D ≤ 10"
PIPELINE FLOWING 3/4 FULL FOR D > 10"
PEAKING FACTORS DETERMINED FROM ATTACHED CURVES
CURRENT ZONING: M2 OR QUARRY

DETERMINE SEWAGE GENERATION RATES:

THE TYPES OF USES ALLOWED IN AN M-2 ZONE ARE MOSTLY "DRY USES", IE. THEY DO NOT PRODUCE LARGE VOLUMES OF SEWAGE. DISCUSSIONS WITH CITY STAFF INDICATE THAT SOME USES WHICH PRODUCE MORE SEWAGE MAY BE ALLOWED, SUCH AS RESTAURANTS OR R&D PARKS, ESPECIALLY ALONG THE FREEWAY FRONTAGE. THEREFORE, SEWAGE GENERATION RATES COULD VARY BETWEEN 1000 gpd/1000SF TO 25gpd/1000 SF.

GIVEN THE LAND REQUIREMENTS FOR THE M2 USES AND THOSE FOR RESTAURANT USES, A COMPROMISE USING AN AVERAGE SEWAGE GENERATION RATE WOULD BE APPROPRIATE. THE MAJORITY OF LAND WOULD UNDOUBTEDLY BE DEVOTED TO USES SUCH AS LUMBER YARD, WAREHOUSING, AUTO SALES, TRUCKING & SOME OFFICE TYPE USES. VERY SMALL AMOUNTS OF LAND WOULD BE DEVOTED TO MORE INTENSIVE USES SUCH AS RESTAURANTS & HEALTH CLUBS.

A TOTAL OF 357 ACRES, PLUS THE PROJECT SITE, ARE TRIBUTARY TO THE SUBJECT SEWER MAIN. OF THIS LARGE SINGLE PARCELS OF 10 ACRES OR MORE EQUAL 287 ACRES.

THE FOLLOWING IS A THEORETICAL BREAKDOWN BY LANDUSE TYPE OF THE TRIBUTARY AREA:

AREA		SEWAGE *
287	WAREHOUSING, LUMBERYARD, OPEN STORAGE, NURSERY, DRY MANUFACTURING ETC.	25 gpd/1000 SF
60 Ac	OFFICE BLDG., R&D ETC, AUTO SALES	200 gpd/1000 SF
10 Ac	RESTAURANT	1000 gpd/1000 SF

USE A "WEIGHTED AVG"

$$\frac{287(25\text{gpd}/1000) + 60(200) + 10(1000)}{357} = 81.7\text{gpd}/1000\text{SF}$$

USE 80 gpd/1000 SF AVERAGE SEWAGE GENERATION FOR SURROUNDING PROPERTIES

CONVERT TO CFS/ACRE

$$Q = 80\text{gpd}/1000\text{SF} \times \frac{1\text{DAY}}{24\text{hr}} \times \frac{1\text{HR}}{60\text{m}} \times \frac{1\text{m}}{60\text{S}} \times \frac{1\text{CF}}{7.48\text{gal}} \times \frac{43560\text{SF}}{1\text{AC}}$$

$$= .0054\ \text{cfs/Ac}$$

DETERMINE SEWAGE VOLUME FOR LA MARKET PLACE

ESTIMATED ATTENDANCE = 20,000 PEOPLE PER DAY

* SEWAGE GENERATION = 10 gpd/PERSON (ATTENDANCE)

$$Q = 10\text{gpd}/\text{PERSON} \times 20{,}000 \times \frac{1\text{CF}}{7.48\text{gal}} \times \frac{1\text{DAY}}{24\text{HR}} \times \frac{1\text{HR}}{60\text{m}} \times \frac{1\text{m}}{60\text{S}}$$

$$= 0.3095\ \text{cfs}$$

* FROM ATTACHED LETTER FROM LA CO. SAN DIST.

A. DETERMINE TRIBUTARY FLOWS

1. LINE "A" LIVE OAK AVE BETWEEN ARROW HWY & SAN GABRIEL RIVER FWY

TRIBUTARY AREA IN ACRES (FROM ASSESSOR'S MAPS)

AREA = 60 + 12.3 + 1.85 + PROJECT SITE

Q_{AT} = 74.15 AC (.0054 CFS/AC) + 0.3095 CFS

= 0.71 CFS AVG. DAY FLOW

2. LINE "B" ARROW HWY BETWEEN LIVE OAK AVE & SAN GABRIEL RIVER FWY

TRIBUTARY AREA IN ACRES (FROM ASSESSOR'S MAPS)

= 10.6 + 12.4 + 35.78 + 44.85 + 43.92

= 147.55

Q_{BT} = 147.55 x .0054 CFS/AC

= 0.80 CFS

3. LINE "C" LIVE OAK AVE. FROM 550' EAST OF PECK ROAD TO ARROW HWY

TRIBUTARY AREA IN ACRES (FROM ASSESSOR'S MAPS)

M-2 USE = 1.55 + 1.55 + 2.0 + 2.0 + 2.458 + 3.598 + 6.054 + 0.4 + 0.3 + 2.29 + 6.93 + 4.0 + 22.06 + 0.4 + 0.2 + 2.02 + 0.28 + 0.23 + 0.36 + 0.3

= 58.98 AC

Q_{CT} = 58.98 x .0054 CFS/AC

= 0.32 CFS

4. LINE "D" EASEMENT So. OF LIVE OAK 550' EAST OF PECK RD.

TRIBUTARY AREA IN ACRES (FROM ASSESSOR'S MAPS)

M-2 USE = 9.3 + 4.77 + 14.3 + 45.53 + 3.3

= 77.20 AC

Q_{DT} = 77.20 Ac × .0054 cfs/Ac

= 0.42 cfs

B. DETERMINE SIZE OF PIPELINES

1. DERIVE STANDARD EQUASIONS

a. ASSUME PIPELINES ≤ 10" ϕ FLOWING 1/2 FULL

USE MANNING'S EQN. & SOLVE FOR DIAMETER

$$Q = A\left(\frac{1.486}{n}\right) R_H^{2/3} S^{1/2}$$

WHERE: A = AREA OF FLOW = $\frac{1}{2}\left(\frac{\pi D^2}{4}\right) = \frac{\pi D^2}{8}$

$$R_H = \frac{A}{P} = \frac{\frac{1}{2}\frac{\pi D^2}{4}}{\frac{1}{2}\pi D} = \frac{D}{4}$$

$n = .013$

THEREFORE: $Q = \frac{\pi D^2}{8}\left(\frac{1.486}{.013}\right)\left(\frac{D}{4}\right)^{2/3} S^{1/2}$

$Q = (17.81)\, D^2 (D^{2/3})\, S^{1/2}$

$Q = 17.81\, D^{8/3} S^{1/2}$ FOR PIPES ≤ 10" ϕ

b. ASSUME PIPELINES > 10" ϕ FLOWING 3/4 FULL
USE MANNING'S EQN & SOLVE FOR DIAMETER

$$Q = A\left(\frac{1.486}{n}\right) R_H^{2/3} S^{1/2}$$

WHERE: A = AREA OF FLOW $= 0.632D^2$ FROM TABLE 7-4 *

$R_H = \frac{A}{P} = 0.302D$ FROM TABLE 7-5 *

$n = .013$

* KING'S HANDBOOK OF HYDRAULICS PAGE 7-35
FOR $D/d = 0.75$

THEREFORE: $Q = 0.632D^2\left(\frac{1.486}{.013}\right)(0.302D)^{2/3} S^{1/2}$

$= 32.52\ D^2 (D^{2/3}) S^{1/2}$

$Q = 32.52\ D^{8/3} S^{1/2}$ FOR PIPES > 10" ϕ

2. DETERMINE PEAK FLOW IN EACH PIPELINE

a. LINE "A"

$Q_A = 0.71$ cfs $F = 2.8$ FROM ATTACHED GRAPH FIG. 2-5 LA CO SAN. DIST.

$Q_{AP} = 0.71\ (F)$

$Q_{AP} = 0.71\ (2.8)$

$= 1.99$ cfs

b. LINE "B"

$Q_{BT} = 0.80$ cfs F = 2.7 FROM ATTACHED GRAPH

$Q_{BP} = 0.80\ (F)$

$= 0.80\ (2.7)$

$= 2.16$ cfs

c. LINE "C"

$Q_C = Q_{AT} + Q_{BT} + Q_{CT}$ F = 2.5 FROM ATTACHED GRAPH

$= 0.71 + 0.80 + 0.32$

$= 1.83$ cfs

$Q_{CP} = 1.83\ (F)$

$= 1.83\ (2.5) = 4.58$ cfs

d. LINE "D"

$Q_{DT} = 0.42$ cfs

F = 2.9 FROM ATTACHED GRAPH

$Q_{DP} = 0.42(F)$

$= .42(2.9)$ cfs $= 1.22$ cfs

e. LINE "E"

$Q_E = Q_C + Q_{DT}$ F = 2.45 FROM ATTACHED GRAPH

$= 1.83 + 0.42$

$= 2.25$ cfs

$Q_{EP} = 2.25\ (F)$

$= 2.25\ (2.45) = 5.51$ cfs

3. DETERMINE PIPE SIZES

a. LINE A ASSUME $D > 10"\phi$

$Q = 32.52\, D^{8/3} S^{1/2}$ $S = .004$

$1.99 = 32.52\, D^{8/3} (.004)^{1/2}$

$D^{8/3} = 0.9675$

$D = 0.99$ ft $= 11.85$ INCHES USE 12" PIPE

b. LINE B ASSUME $D > 10"$

$Q = 32.52\, D^{8/3} S^{1/2}$ $S = .004$

$2.16 = 32.52\, D^{8/3} (.004)^{1/2}$

$D^{8/3} = 1.05$

$D = 1.02$ ft $= 12.2$ IN. USE 12" PIPE

C. LINE C ASSUME $D > 10"$

$Q = 32.52\, D^{8/3} S^{1/2}$ $S = .004$

$4.58 \text{cfs} = 32.52\, D^{8/3} (.004)^{1/2}$

$D^{8/3} = 2.23$

$D = 1.35$ ft $= 16.2$ IN. USE 18" PIPE

d. LINE D ASSUME $D > 10"$

$Q = 32.52\, D^{8/3} S^{1/2}$ $S = .004$

$1.22 = 32.52\, D^{8/3} (.004)^{1/2}$

$D^{8/3} = 0.5932$

$D = 0.82$ ft $= 9.87$ USE 10" PIPE

℄ LINE E ASSUME D > 10"

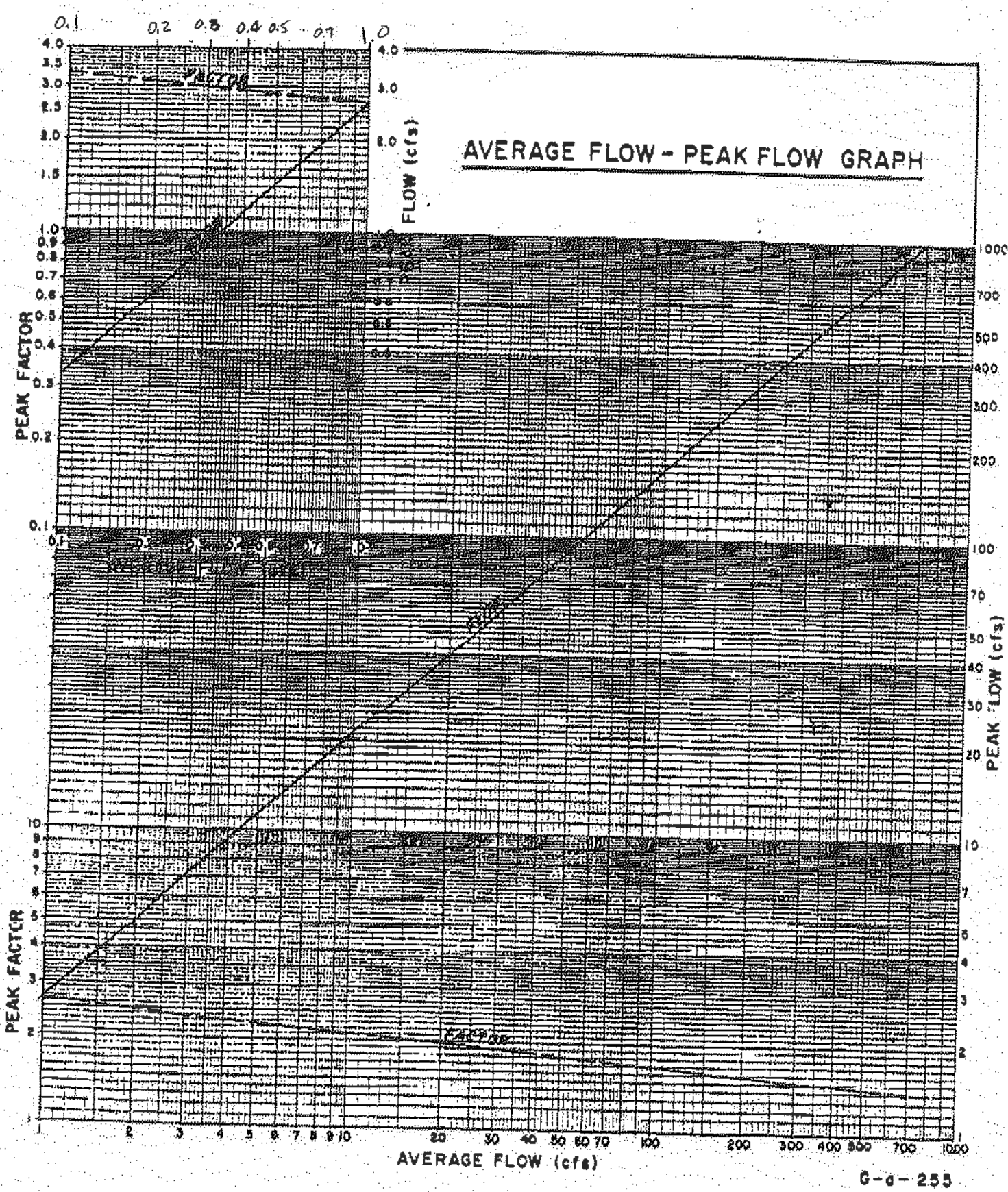
$Q = 32.52\, D^{8/3}\, S^{1/2}$ $S = .004$

$5.51 = 32.52\, D^{8/3}(.004)^{1/2}$

$D^{8/3} = 2.68$

$D = 1.45$ ft $= 17.36$ IN. USE 18" ∅ PIPE

LACO SANITATION DIST.



G-a-255

WASTEWATER RECLAMATION
SOLID WASTE MANAGEMENT

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

1955 Workman Mill Road, Whittier, CA 90601-4998
Mailing Address: P. O. Box 4998, Whittier, CA 90607-4998
Telephone: (213) 699-7411, (213) 685-5217

CHARLES W. CARRY
Chief Engineer and General Manager

October 5, 1989

File No: JOA-00.00-00

Ms. Barbara Hull
Kenneth Mullen Consulting Engineers
325 North Santa Anita Avenue
Arcadia, CA 91006

Dear Ms. Hull:

Standard Wastewater Discharge Factors

Enclosed, per your request, is a copy of the standard wastewater discharge factors used by the Sanitation Districts.

If you have any questions regarding this information, please contact the undersigned at (213) 699-7411, extension 2704.

Very truly yours,

Charles W. Carry

David B. Bruns
Supervising Civil Engineer
Financial Planning &
Property Management Section

DBB:mah

Enclosure

TABLE 1

LOADINGS FOR EACH CLASS OF LAND USE

DESCRIPTION	UNIT OF MEASURE	FLOW (Gallons per Day)	COD (Pounds per Day)	SUSPENDED SOLIDS (Pounds per Day)
RESIDENTIAL				
Single Family Home	Parcel	260	1.22	0.59
Duplex	Parcel	312	1.46	0.70
Triplex	Parcel	468	2.19	1.05
Fourplex	Parcel	624	2.92	1.40
Condominiums	Parcel	156	0.73	0.35
Single Family Home (reduced rate)	Parcel	156	0.73	0.35
Five Units or More	No. of Dwlg. Units	156	0.73	0.35
Mobile Home Parks	No. of Spaces	156	0.73	0.35
COMMERCIAL				
Hotel/Motel/Rooming House	Room	125	0.54	0.28
Store	1000 ft^2	100	0.43	0.23
Supermarket	1000 ft^2	150	2.00	1.00
Shopping Center	1000 ft^2	325	3.00	1.17
Office Building	1000 ft^2	200	0.86	0.45
Professional Building	1000 ft^2	300	1.29	0.68
Restaurant	1000 ft^2	1,000	16.68	5.00
Indoor Theatre	1000 ft^2	125	0.54	0.28
Car Wash				
Tunnel Type	1000 ft^2	3,700	15.86	8.33
Wand Type	1000 ft^2	700	3.00	1.58
Financial Institution	1000 ft^2	100	0.43	0.23
Service Shop	1000 ft^2	100	0.43	0.23
Animal Kennels	1000 ft^2	100	0.43	0.23
Service Station	1000 ft^2	100	0.43	0.23
Auto Sales/Repair	1000 ft^2	100	0.43	0.23
Wholesale Outlet	1000 ft^2	100	0.43	0.23
Nursery/Greenhouse	1000 ft^2	25	0.11	0.06
Manufacturing	1000 ft^2	200	1.86	0.70
Dry Manufacturing	1000 ft^2	25	0.23	0.09
Lumber Yard	1000 ft^2	25	0.23	0.09
Warehousing	1000 ft^2	25	0.23	0.09
Open Storage	1000 ft^2	25	0.23	0.09
Drive-in Theatre	1000 ft^2	20	0.09	0.05
Night Club	1000 ft^2	350	1.50	0.79
Bowling/Skating	1000 ft^2	150	1.76	0.55

TABLE 1

(continued)

LOADINGS FOR EACH CLASS OF LAND USE

DESCRIPTION	UNIT OF MEASURE	FLOW (Gallons per Day)	COD (Pounds per Day)	SUSPENDED SOLIDS (Pounds per Day)
COMMERCIAL				
Club	1000 ft²	37	0.16	0.08
Auditorium, Amusement	1000 ft²	350	1.50	0.79
Golf Course, Camp, and Park (Structures and Improvements)	1000 ft²	100	0.43	0.23
Convalescent Home	Bed	125	0.54	0.28
Laundry	1000 ft²	3,825	16.40	8.61
Mortuary/Cemetery	1000 ft²	100	1.33	0.67
Health Spa, Gymnasium				
With Showers	1000 ft²	600	2.58	1.35
Without Showers	1000 ft²	300	1.29	0.68
Convention Center, Fairground, Racetrack, Sports Stadium/Arena	Average Daily Attendance	10	0.04	0.02
INSTITUTIONAL				
College/University	Student	20	0.09	0.05
Private School	1000 ft²	200	0.86	0.45
Church (noncharitable)	1000 ft²	50	0.21	0.11

Table 7-3. For Determining the Vertical Distance $\bar{y}$ below the Water Surface to the Center of Gravity of a Cross Section of a Trapezoidal Channel

Let $\frac{\text{depth of water}}{\text{bottom width of channel}} = \frac{D}{b}$ and $C_{\bar{y}}$ = tabulated value. Then $\bar{y} = C_{\bar{y}} D$.

$\frac{D}{b}$	Side slopes of channel, ratio of horizontal to vertical									
	⅛–1	¼–1	⅜–1	½–1	1–1	1½–1	2–1	2½–1	3–1	4–1
0.05	.499	.498	.496	.494	.492	.488	.485	.481	.478	.472
.1	.498	.496	.492	.488	.485	.478	.472	.467	.462	.452
.15	.497	.494	.488	.483	.478	.469	.462	.455	.448	.438
.2	.496	.492	.485	.478	.472	.462	.452	.444	.438	.426
.25	.495	.490	.481	.474	.467	.455	.444	.436	.429	.417
.3	.494	.488	.478	.469	.462	.448	.438	.429	.421	.409
.35	.493	.487	.475	.465	.457	.443	.431	.422	.415	.403
.4	.492	.485	.472	.462	.452	.438	.426	.417	.409	.397
.45	.491	.483	.469	.458	.448	.433	.421	.412	.404	.393
.5	.490	.481	.467	.455	.444	.429	.417	.407	.400	.389
.6	.488	.478	.462	.448	.438	.421	.409	.400	.393	.382
.7	.487	.475	.457	.443	.431	.415	.403	.394	.387	.377
.8	.485	.472	.452	.438	.426	.409	.397	.389	.382	.373
.9	.483	.469	.448	.433	.421	.404	.393	.385	.378	.370
1.0	.481	.467	.444	.429	.417	.400	.389	.381	.375	.367
1.1	.480	.464	.441	.425	.413	.396	.385	.378	.372	.364
1.2	.478	.462	.438	.421	.409	.393	.382	.375	.370	.362
1.3	.477	.459	.434	.418	.406	.390	.380	.373	.367	.360
1.4	.475	.457	.431	.415	.403	.387	.377	.370	.365	.359
1.5	.474	.455	.429	.412	.400	.385	.375	.368	.364	.357
1.6	.472	.452	.426	.409	.397	.382	.373	.367	.362	.356
1.7	.471	.450	.423	.407	.395	.380	.371	.365	.361	.355
1.8	.469	.448	.421	.404	.393	.378	.370	.364	.359	.354
1.9	.468	.446	.419	.402	.391	.377	.368	.362	.358	.353
2.0	.467	.444	.417	.400	.389	.375	.367	.361	.357	.352

Table 7-4. For Determining the Area a of the Cross Section of a Circular Conduit Flowing Part Full

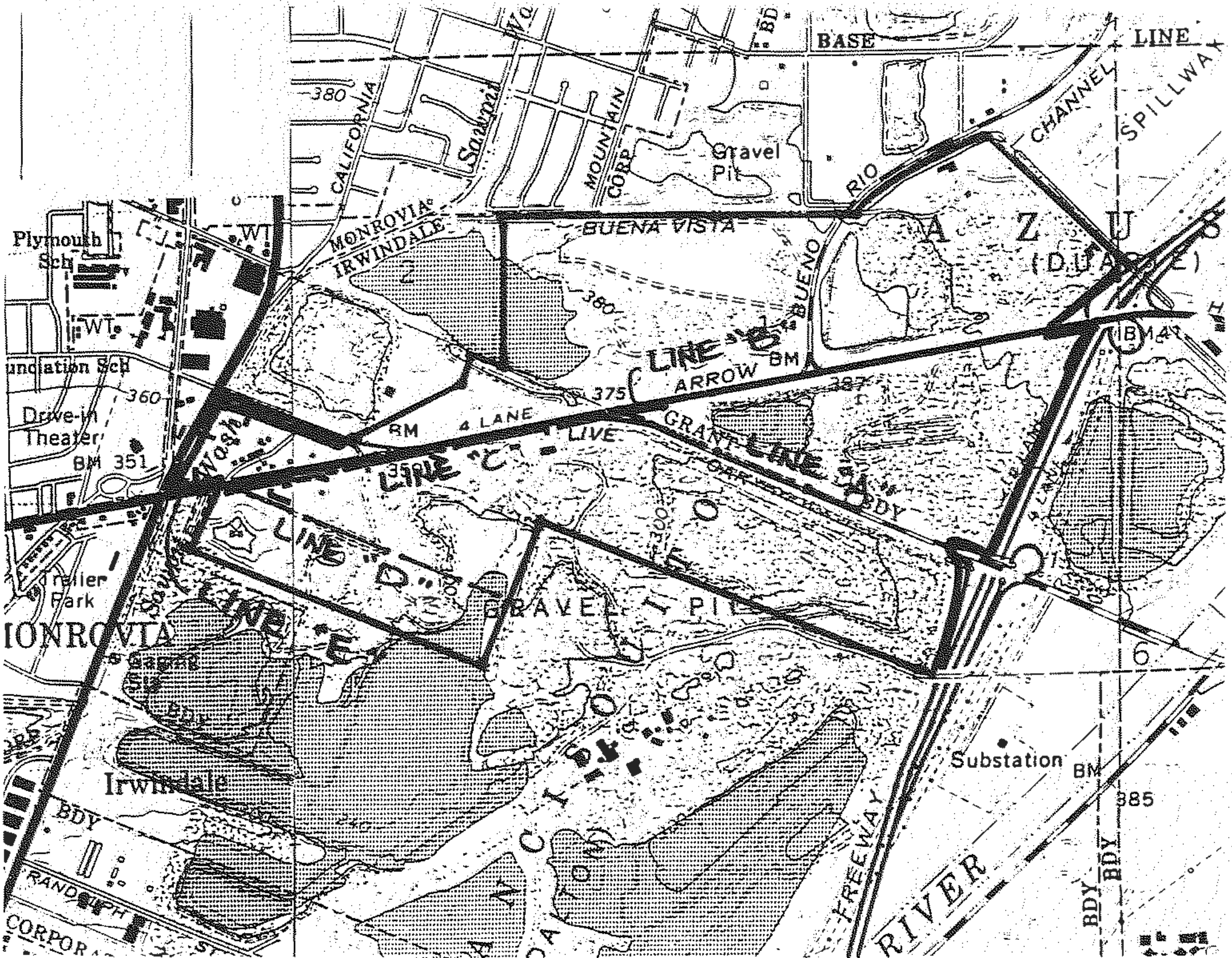
Let $\frac{\text{depth of water}}{\text{diameter of channel}} = \frac{D}{d}$ and C_a = the tabulated value. Then $a = C_a d^2$.

$\frac{D}{d}$	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.0000	.0013	.0037	.0069	.0105	.0147	.0192	.0242	.0294	.0350
.1	.0409	.0470	.0534	.0600	.0668	.0739	.0811	.0885	.0961	.1039
.2	.1118	.1199	.1281	.1365	.1449	.1535	.1623	.1711	.1800	.1890
.3	.1982	.2074	.2167	.2260	.2355	.2450	.2546	.2642	.2739	.2836
.4	.2934	.3032	.3130	.3229	.3328	.3428	.3527	.3627	.3727	.3827
.5	.393	.403	.413	.423	.433	.443	.453	.462	.472	.482
.6	.492	.502	.512	.521	.531	.540	.550	.559	.569	.578
.7	.587	.596	.605	.614	.623	.632	.640	.649	.657	.666
.8	.674	.681	.689	.697	.704	.712	.719	.725	.732	.738
.9	.745	.750	.756	.761	.766	.771	.775	.779	.782	.784

Table 7-5. For Determining the Hydraulic Radius r of the Cross Section of a Circular Conduit Flowing Part Full

Let $\frac{\text{depth of water}}{\text{diameter of channel}} = \frac{D}{d}$ and C_r = the tabulated value. Then $r = C_r d$.

$\frac{D}{d}$	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.000	.007	.013	.020	.026	.033	.039	.045	.051	.057
.1	.063	.070	.075	.081	.087	.093	.099	.104	.110	.115
.2	.121	.126	.131	.136	.142	.147	.152	.157	.161	.166
.3	.171	.176	.180	.185	.189	.193	.198	.202	.206	.210
.4	.214	.218	.222	.226	.229	.233	.236	.240	.243	.247
.5	.250	.253	.256	.259	.262	.265	.268	.270	.273	.275
.6	.278	.280	.282	.284	.286	.288	.290	.292	.293	.295
.7	.296	.298	.299	.300	.301	.302	.302	.303	.304	.304
.8	.304	.304	.304	.304	.304	.303	.303	.302	.301	.299
.9	.298	.296	.294	.292	.289	.286	.283	.279	.274	.267



BASE LINE
SPILLWAY
CHANNEL
RIO
Gravel Pit
MOUNTAIN
CORP
CALIFORNIA
380
MONROVIA
IRWINDALE
BUENA VISTA
BUENO
AZUSA (DUARTE)
LINE "B"
ARROW
BM
375
387
4 LANE
GRANT LINE
LINE "A"
LIVE OAK
LINE "C"
LINE "D"
LINE "E"
GRAVEL PIT
Plymouth Sch
WT
Drive-in Theater
BM 351
360
Wash
Trailer Park
MONROVIA
Irwindale
BDY
RANDOLPH
CORPOR
FREEWAY
RIVER
Substation
385
6

SUBDIVISION OF THE RANCHO AZUSA DE DUANTE

CODE
3424

M.R. 6 - 80 - 82

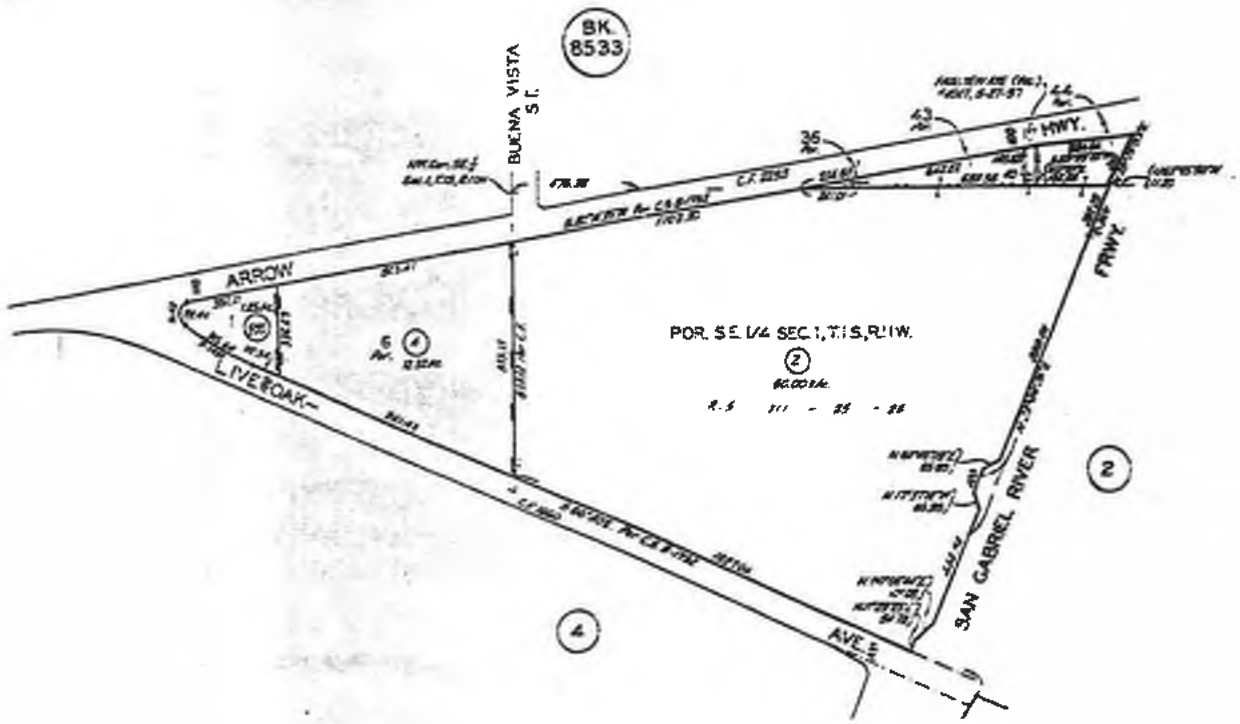
POR. SEC. 36, T.1N., R.11W.

FOR PREV. ASSMT. SEE: 1370 - 32

ASSESSOR'S MAP
COUNTY OF LOS ANGELES, CALIF.

8532 | 1

SCALE 1" = 400'

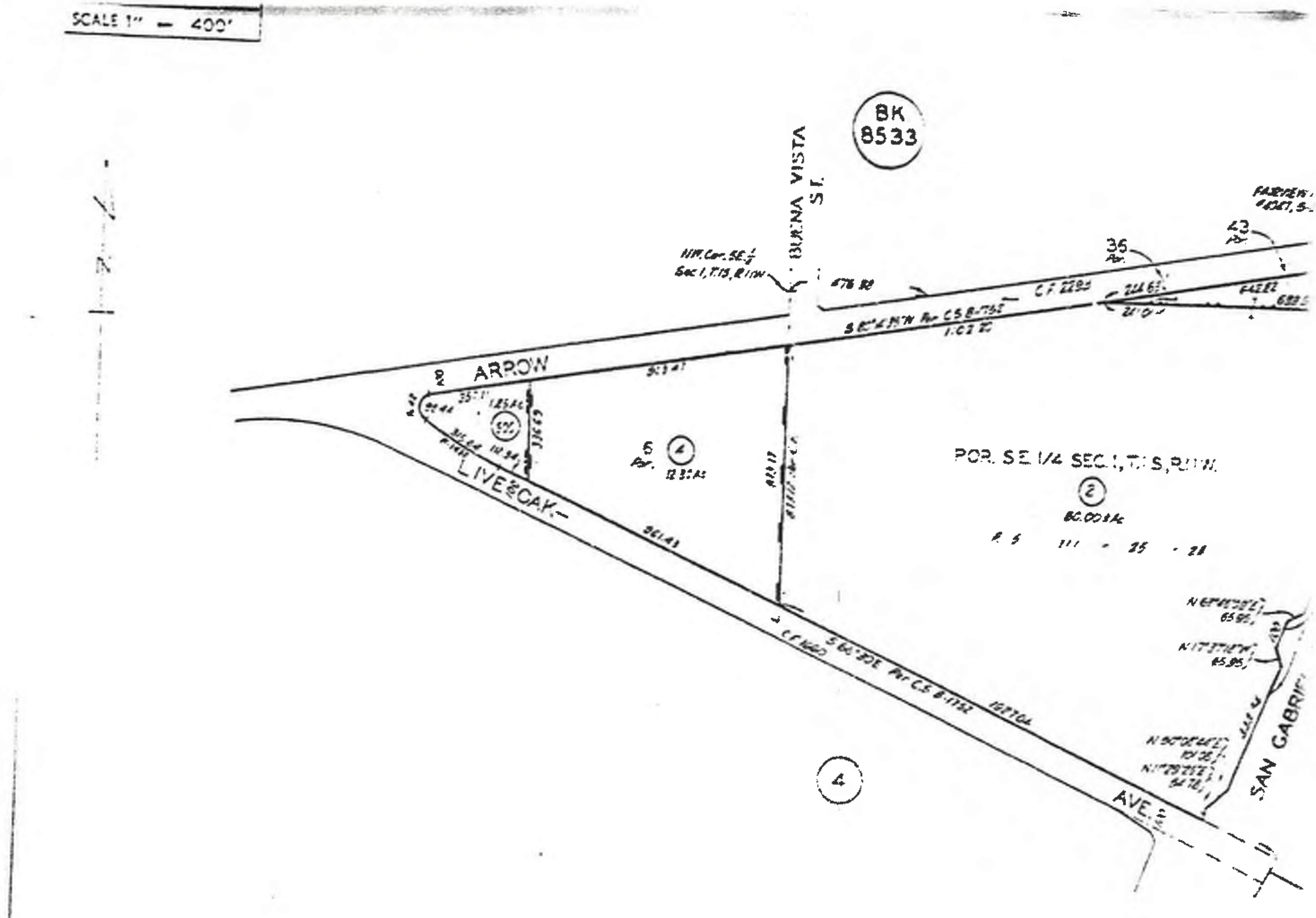


PARCEL MAP ____ P.M. 198 - 77-78

AZUSA RANCHO FINALLY
CONFIRMED TO ANDREAS DUARTE P.2-560-561

SUBDIVISION OF THE

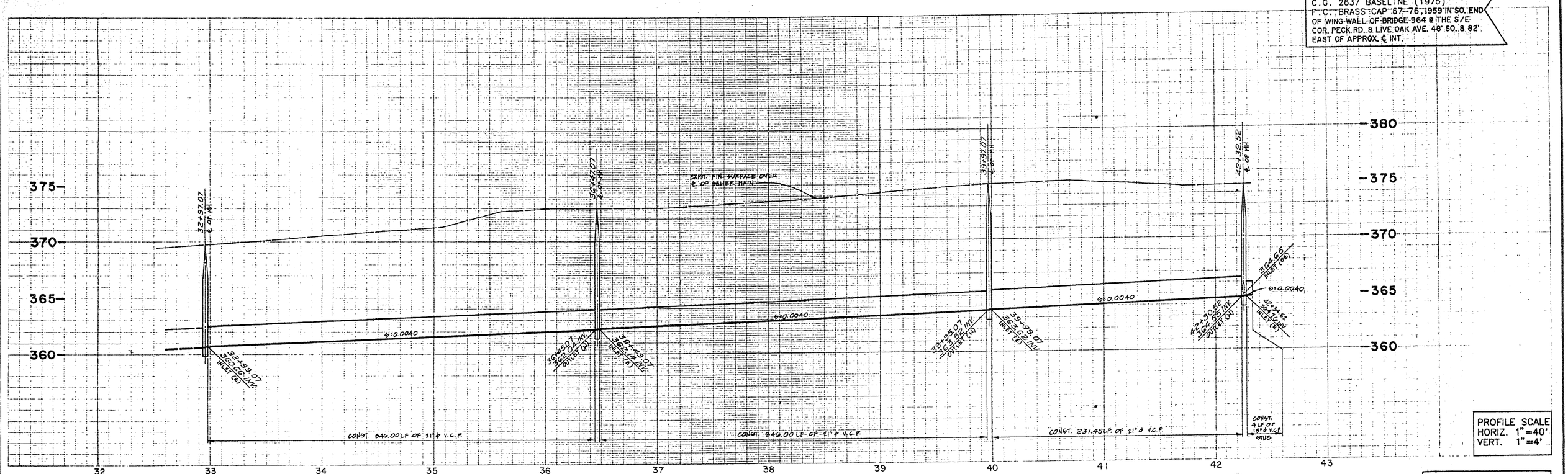
All 905 series parcels on this page are assessed to the Irwindale Community Redevelopement Agency, unless otherwise noted.


SCALE 1" — 400'
BK
8533
N
BUENA VISTA
ST.
ARROW
LIVE OAK
AVE.
SAN GABRIEL
POR. S.E. 1/4 SEC. 1, T.1S, R.11W.
2
4
5
Por.
36
Por.
43
Por.

Live Oak Sanitary Sewer Improvement Plans

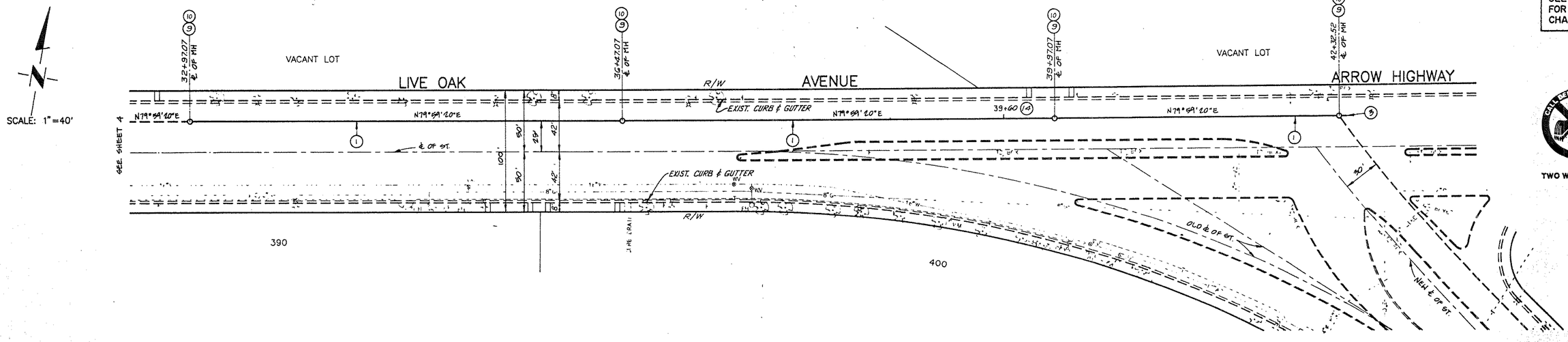
BENCHMARK ELEV. 353.87

C.G. 2637 BASELINE (1975)
F.C. BRASS CAP 67-76, 1959 IN SO. END OF WING-WALL OF BRIDGE 964 @ THE S/E COR. PECK RD. & LIVE OAK AVE. 48' SO. & 82' EAST OF APPROX. ℄ INT.



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

SEE SANITATION DISTRICT FOR SPECIAL CONNECTION CHARGES. (310) 699-7411 Extension 2713



LIVE OAK AVENUE

SEE SHEET 6

Underground Service Alert of Southern California
Call: TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

NOTE:
THE EXISTENCE & LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS DRAWING. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN & ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS. HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

Carlos Alvarado 11/13/92
CITY ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
KENNETH I. MULLEN
No. 9692
Exp. 12/31/92
CIVIL
STATE OF CALIFORNIA

APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO - CITY ENGINEER
BY: Carlos Alvarado C19857 R.C.E. DATE: 11/13/92

REV.	DATE	BY	DESCRIPTION

SUBMITTED:
Kenneth I. Mullen 9692 R.C.E. 9/24/92 DATE
FOR THE CONSULTANT
APPROVED:
DATE

DESIGNED: R.S.
DRAWN: R.S.
CHECKED: K.J.M.

SCALE: AS SHOWN

KENNETH I. MULLEN, CONSULTING ENGINEERS, INC.
ARCADIA
(818) 445-2212

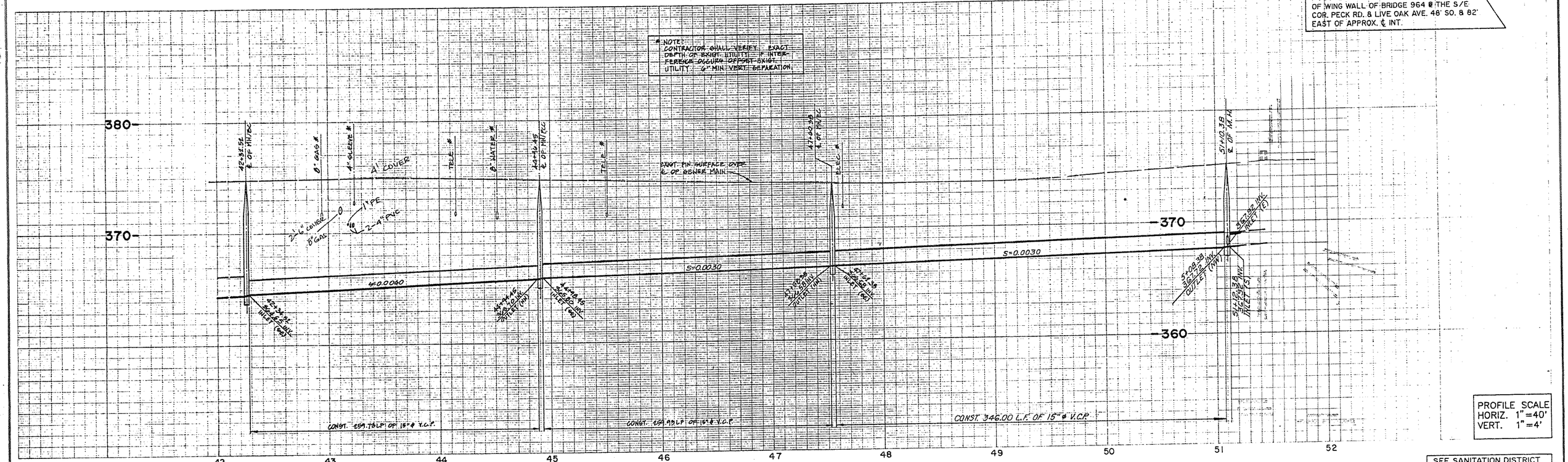
CITY OF IRWINDALE
LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS
FROM STA. 32+97.07 TO STA. 42+32.52

SHEET 5 OF 8 SHEETS

Std. 8.02 2/82

BENCHMARK ELEV. 353.87

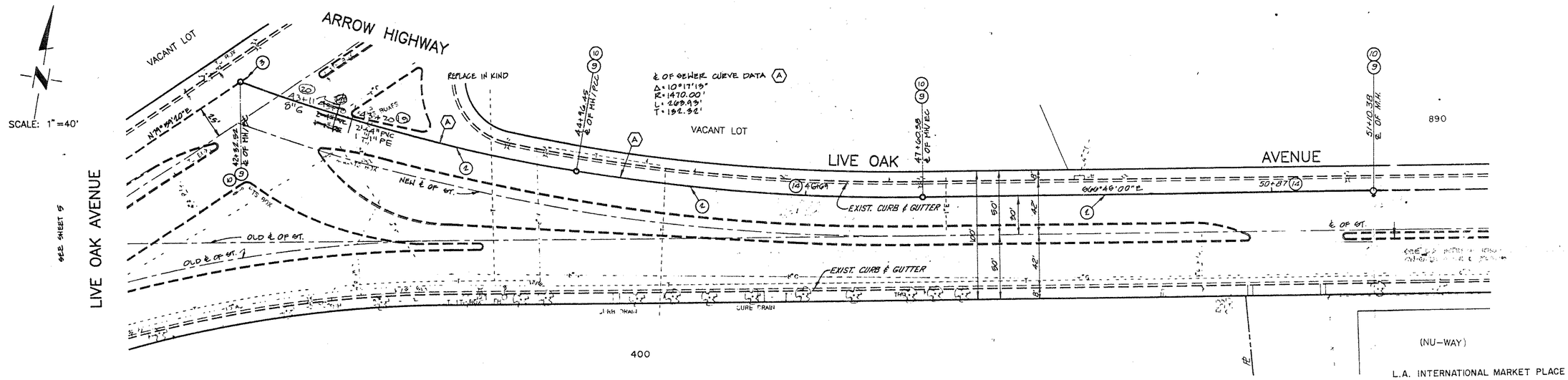
C.G. 2637 BASELINE (1975)
F.C. BRASS CAP 67-76, 1959 IN SO. END OF WING WALL OF BRIDGE 964 @ THE S/E COR. PECK RD. & LIVE OAK AVE. 46' SO. & 82' EAST OF APPROX. ℄ INT.



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

SEE SANITATION DISTRICT FOR SPECIAL CONNECTION CHARGES. (310) 699-7411 Extension 2713

SCALE: 1"=40'



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Call: TOLL FREE
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422-4133
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NOTE:
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APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO, CITY ENGINEER
BY: Carlos Alvarado C19857 R.C.E. DATE: 11/13/92

THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS. HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

Carlos Alvarado 11/13/92
CITY ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
KENNETH T. MULLEN
No. 9692
Exp. 12/31/92
CIVIL
STATE OF CALIFORNIA

REV.	DATE	BY	DESCRIPTION

SUBMITTED: Kenneth T. Mullen 9692 R.C.E. 9/30/92 DATE
FOR THE CONSULTANT
APPROVED: DATE

DESIGNED: R.S.
DRAWN: R.S.
CHECKED: K.I.M.

SCALE: AS SHOWN

KENNETH I. MULLEN, CONSULTING ENGINEERS, INC.
KIM
ARCADIA
(818) 445-2212

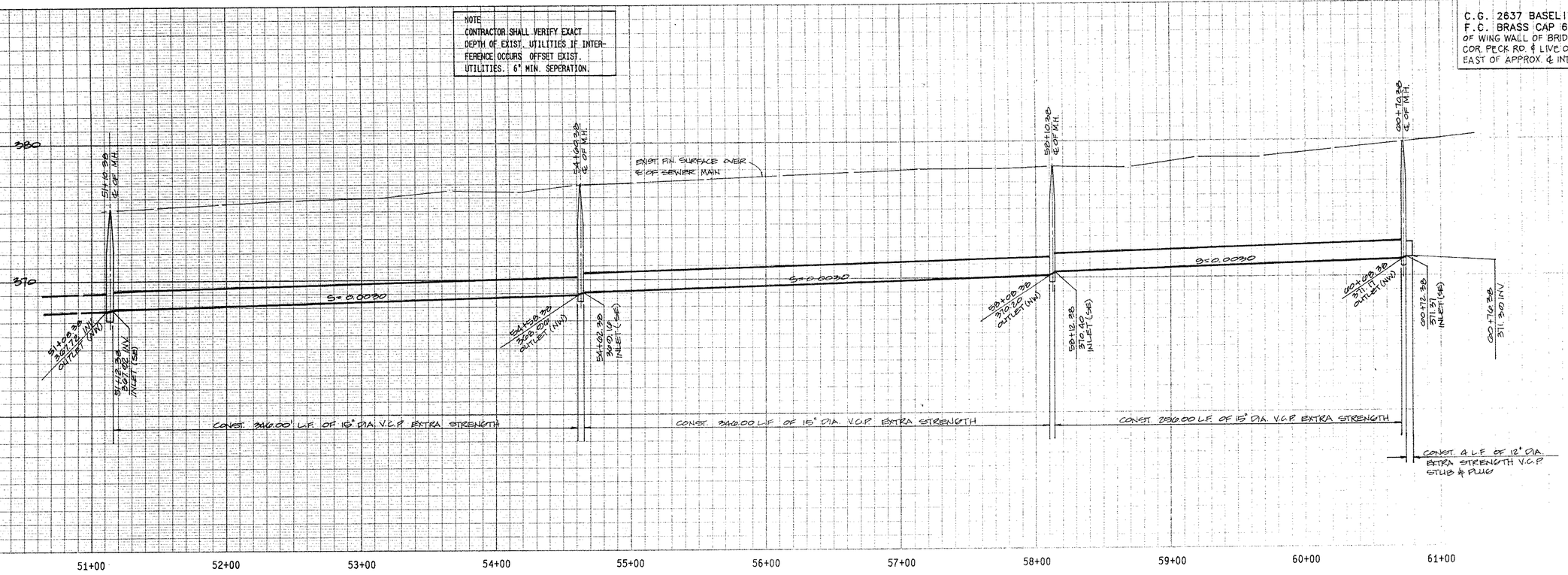
CITY OF IRWINDALE
LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS
FROM STA. 42+32.52 TO STA. 51+59.50.

SHEET 6 OF 8 SHEETS

Std. 8.02 9/82

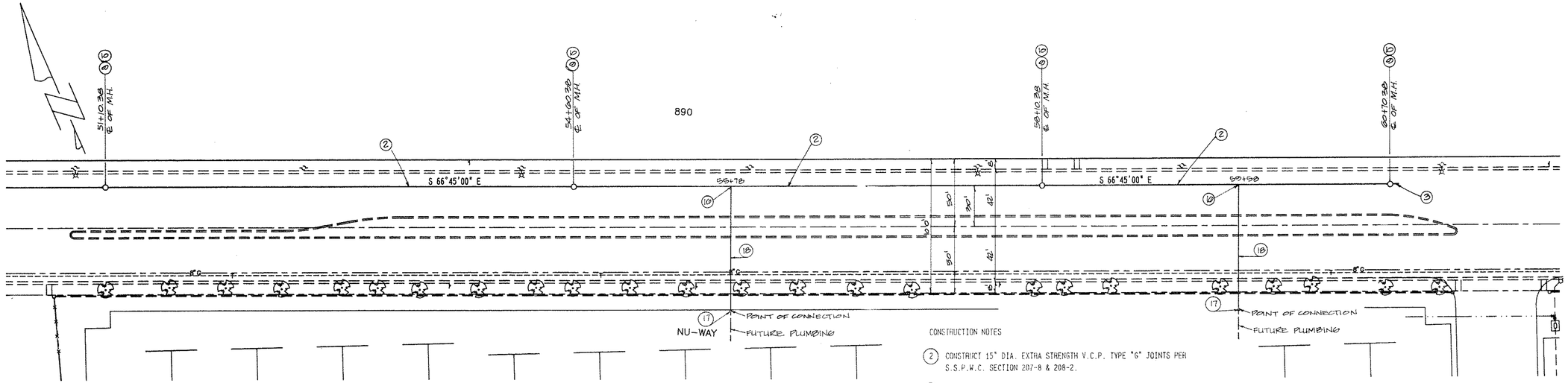
NOTE
CONTRACTOR SHALL VERIFY EXACT DEPTH OF EXIST. UTILITIES IF INTERFERENCE OCCURS OFFSET EXIST. UTILITIES. 6" MIN. SEPERATION.

BENCHMARK ELEV. 353.87
C.G. 2637 BASELINE (1975)
F.C. BRASS CAP 67-76, 1959 IN SO. END OF WING WALL OF BRIDGE 964 ℄ THE S/E. COR. PECK RD. & LIVE OAK AVE. 48' SO. & 82' EAST OF APPROX. ℄ INT.



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

SEE SANITATION DISTRICT FOR SPECIAL CONNECTION CHARGES. (310) 699-7411 Extension 2713



CONSTRUCTION NOTES

(2) CONSTRUCT 15" DIA. EXTRA STRENGTH V.C.P. TYPE "G" JOINTS PER S.S.P.W.C. SECTION 207-8 & 208-2.
(3) CONSTRUCT 4 L.F. OF 12" DIA. V.C.P. STUB & PLUG END.
(9) CONSTRUCT STD. MANHOLE PER L.A.C.D.P.W. STD. 2003-0.
(10) CONSTRUCT MANHOLE FRAME & COVER PER APWA STD. PLAN 210
(16) 15" X 8" TEE V.C.P. PER LACOPWSTD 2024-0.
(17) CONSTRUCT CLEANOUT
(18) CONSTRUCT 8" DIA V.C.P

THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS. HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

CITY ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
BARBARA L. HALL
No. 42206
Exp. 03/31/96
CIVIL
STATE OF CALIFORNIA

APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO – CITY ENGINEER
BY: _____ R.C.E. _____ DATE

REV.	DATE	BY	DESCRIPTION

SUBMITTED:
FOR THE CONSULTANT 42206 R.C.E. DATE
APPROVED:
DATE

DESIGNED: B.L.H.
DRAWN: I.C.
CHECKED: B.L.H.

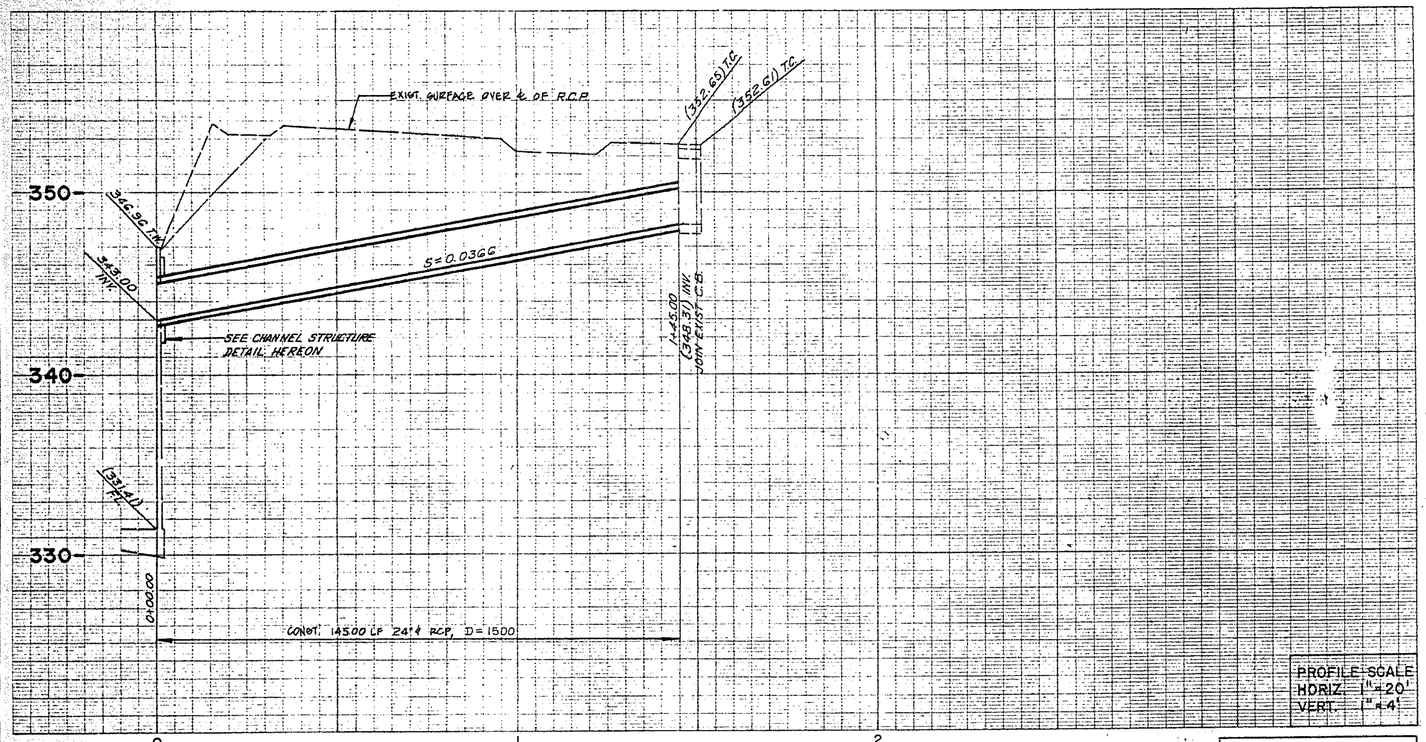
SCALE:
1"=40' HORIZ.
1"=4' VERT.

CIVILTEC engineering inc.
855 WEST FOOTHILL BLVD.
MONROVIA, CA. 91016
(818) 357-0588

NOTE:
THE EXISTENCE & LOCATION OF UNDER GROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS DRAWING. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN & ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

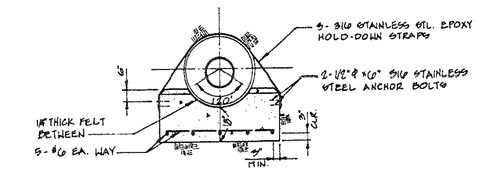
CITY OF IRWINDALE
LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS
FROM STA. 51+10.38 TO STA. 60+76.38

SHEET 7 OF 8 SHEETS

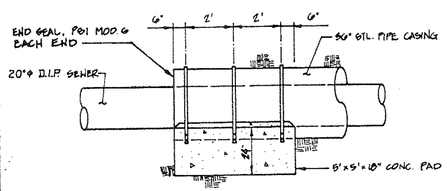


PROFILE SCALE
HORIZ. 1"=20'
VERT. 1"=4'

SEE SANITATION DISTRICT FOR SPECIAL CONNECTION CHARGES. (310) 699-7411 Extension 2713



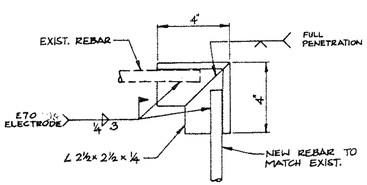
SECTION



ELEVATION

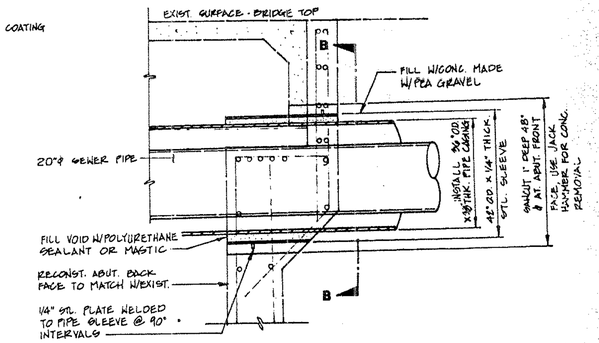
CONCRETE PAD DETAIL

SCALE: 1"=3'



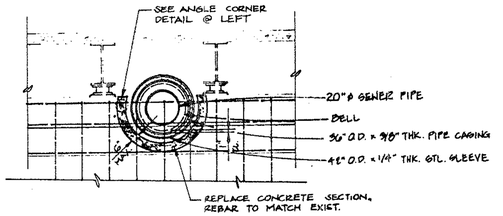
ANGLE CORNER DETAIL

SCALE: 3"=1'



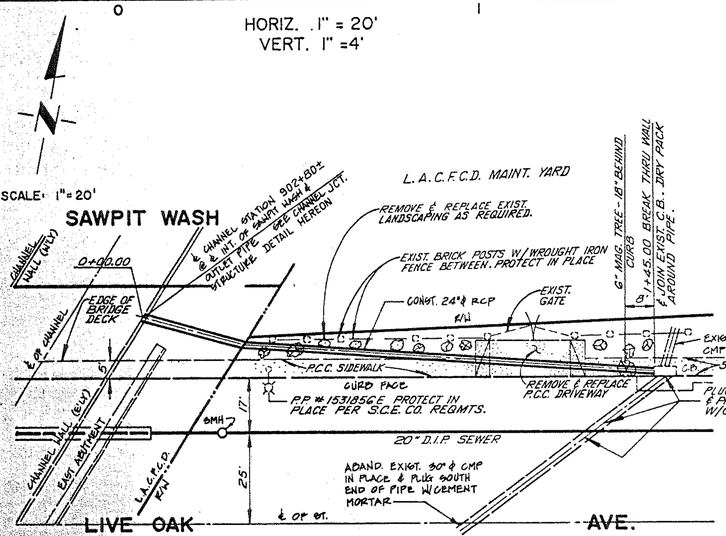
TYP. SECTION THRU ABUTMENT

SCALE: 1"=2'



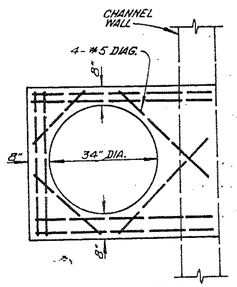
ELEVATION "B"

SCALE: 1"=4'



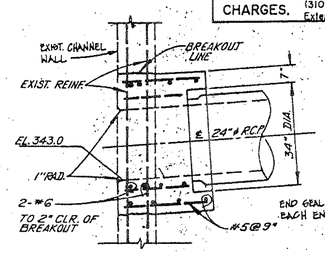
24"ϕ RCP RELOCATION PLAN

1"=20'



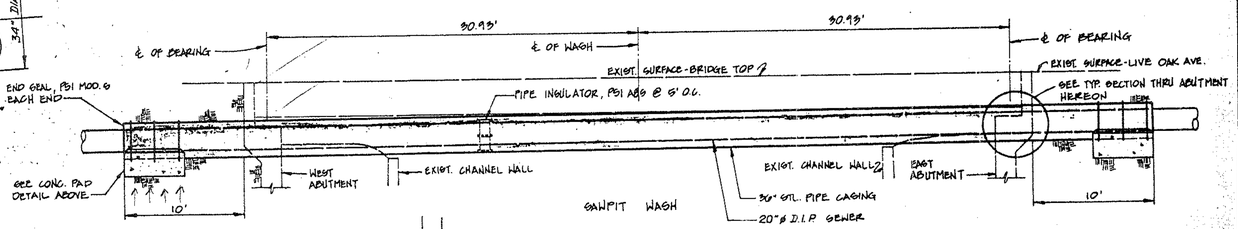
SECTION B-B

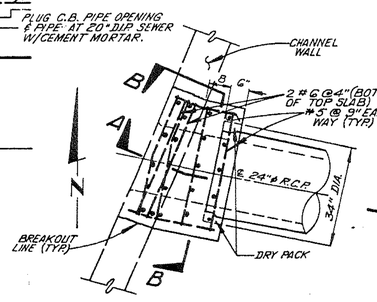
1/2"=1'-0"



SECTION A-A

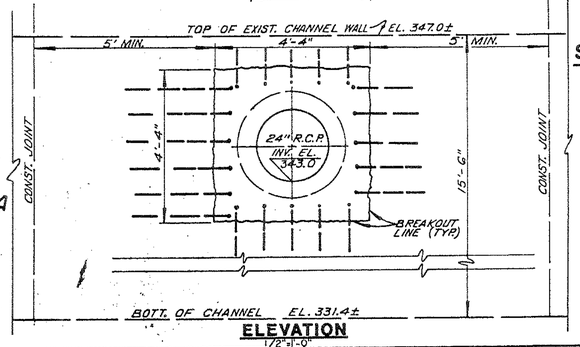
1/2"=1'-0"





JUNCTION STRUCTURE PLAN-TOP SLAB

1/2"=1'-0"



ELEVATION

1/2"=1'-0"

36" STEEL PIPE CASING DETAIL

SCALE: 1"=6'

CONSTRUCTION NOTES

1. CUT EXPOSED REINFORCING STEEL AT CENTER OF OPENING AND BEND INTO TOP, BOTTOM AND WALLS OF JUNCTION STRUCTURE.
2. CORPS OF ENGINEERS SPECS., "SPECIAL PROVISIONS FOR CONNECTING DRAINS TO CHANNEL WALL," SHALL BE USED FOR THIS CONN.
3. LAP ALL REINFORCING MIN. OF 30 DIAMETERS.
4. 3000 P.S.I. CONC. SHALL BE USED FOR STRUCTURES WITHIN THE CHANNEL R/W.

APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO - CITY ENGINEER
BY: Carlos Alvarado C18857 R.C.E. DATE: 11/13/92

THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS. HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

Carlos Alvarado 11/13/92
CITY ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER KENNETH I. MULLEN No. 9692 Exp. 12/31/92 CIVIL STATE OF CALIFORNIA

REV.	DATE	BY	DESCRIPTION

SUBMITTED: Kenneth I. Mullen 9692 R.C.E. 9/24/92 DATE
FOR THE CONSULTANT
APPROVED: DATE

DESIGNED: R.S./B.H.
DRAWN: R.S.
CHECKED: K.I.M.

SCALE: AS SHOWN

KENNETH I. MULLEN, CONSULTING ENGINEERS, INC.
ARCADIA
(818) 445-2212

CITY OF IRWINDALE
LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS
SECTIONS & DETAILS

SHEET 8 OF 8 SHEETS

1009 11 KIM

Appendix E

LA Marketplace Sewer Design
Live Oak Study

THE FOLLOWING IS A THEORETICAL BREAKDOWN BY LANDUSE TYPE OF THE TRIBUTARY AREA:

AREA		SEWAGE *
287	WAREHOUSING, LUMBERYARD, OPEN STORAGE, NURSERY, DRY MANUFACTURING ETC.	25 gpd/1000 SF
60 Ac	OFFICE BLDG., R&D ETC, AUTO SALES	200 gpd/1000 SF
10 Ac	RESTAURANT	1000 gpd/1000 SF

USE A "WEIGHTED AVG"

$$\frac{287(25\text{gpd}/1000) + 60(200) + 10(1000)}{357} = 81.7\text{gpd}/1000\text{SF}$$

USE 80 gpd/1000 SF AVERAGE SEWAGE GENERATION FOR SURROUNDING PROPERTIES

CONVERT TO CFS/ACRE

$$Q = 80\text{gpd}/1000\text{SF} \times \frac{1\text{DAY}}{24\text{hr}} \times \frac{1\text{HR}}{60\text{m}} \times \frac{1\text{m}}{60\text{S}} \times \frac{1\text{CF}}{7.48\text{gal}} \times \frac{43560\text{SF}}{1\text{AC}}$$

$$= .0054\ \text{cfs/Ac}$$

DETERMINE SEWAGE VOLUME FOR LA MARKET PLACE

ESTIMATED ATTENDANCE = 20,000 PEOPLE PER DAY

* SEWAGE GENERATION = 10 gpd/PERSON (ATTENDANCE)

$$Q = 10\text{gpd}/\text{PERSON} \times 20{,}000 \times \frac{1\text{CF}}{7.48\text{gal}} \times \frac{1\text{DAY}}{24\text{HR}} \times \frac{1\text{HR}}{60\text{m}} \times \frac{1\text{m}}{60\text{S}}$$

$$= 0.3095\ \text{cfs}$$

* FROM ATTACHED LETTER FROM LA CO. SAN DIST.

A. DETERMINE TRIBUTARY FLOWS

1. LINE "A" LIVE OAK AVE BETWEEN ARROW HWY & SAN GABRIEL RIVER FWY

TRIBUTARY AREA IN ACRES (FROM ASSESSOR'S MAPS)

AREA = 60 + 12.3 + 1.85 + PROJECT SITE

Q_{AT} = 74.15 AC (.0054 CFS/AC) + 0.3095 CFS

= 0.71 CFS AVG. DAY FLOW

2. LINE "B" ARROW HWY BETWEEN LIVE OAK AVE & SAN GABRIEL RIVER FWY

TRIBUTARY AREA IN ACRES (FROM ASSESSOR'S MAPS)

= 10.6 + 12.4 + 35.78 + 44.85 + 43.92

= 147.55

Q_{BT} = 147.55 x .0054 CFS/AC

= 0.80 CFS

3. LINE "C" LIVE OAK AVE. FROM 550' EAST OF PECK ROAD TO ARROW HWY

TRIBUTARY AREA IN ACRES (FROM ASSESSOR'S MAPS)

M-2 USE = 1.55 + 1.55 + 2.0 + 2.0 + 2.458 + 3.598 + 6.054 + 0.4 + 0.3 + 2.29 + 6.93 + 4.0 + 22.06 + 0.4 + 0.2 + 2.02 + 0.28 + 0.23 + 0.36 + 0.3

= 58.98 AC

Q_{CT} = 58.98 x .0054 CFS/AC

= 0.32 CFS

4. LINE "D" EASEMENT So. OF LIVE OAK 550' EAST OF PECK RD.

TRIBUTARY AREA IN ACRES (FROM ASSESSOR'S MAPS)

M-2 USE = 9.3 + 4.77 + 14.3 + 45.53 + 3.3

= 77.20 AC

Q_{DT} = 77.20 Ac × .0054 cfs/Ac

= 0.42 cfs

B. DETERMINE SIZE OF PIPELINES

1. DERIVE STANDARD EQUASIONS

a. ASSUME PIPELINES ≤ 10" ϕ FLOWING 1/2 FULL

USE MANNING'S EQN. & SOLVE FOR DIAMETER

$$Q = A\left(\frac{1.486}{n}\right) R_H^{2/3} S^{1/2}$$

WHERE: A = AREA OF FLOW = $\frac{1}{2}\left(\frac{\pi D^2}{4}\right) = \frac{\pi D^2}{8}$

$$R_H = \frac{A}{P} = \frac{\frac{1}{2}\frac{\pi D^2}{4}}{\frac{1}{2}\pi D} = \frac{D}{4}$$

$n = .013$

THEREFORE: $Q = \frac{\pi D^2}{8}\left(\frac{1.486}{.013}\right)\left(\frac{D}{4}\right)^{2/3} S^{1/2}$

$Q = (17.81)\, D^2 (D^{2/3})\, S^{1/2}$

$Q = 17.81\, D^{8/3} S^{1/2}$ FOR PIPES ≤ 10" ϕ

b. ASSUME PIPELINES > 10" ϕ FLOWING 3/4 FULL
USE MANNING'S EQN & SOLVE FOR DIAMETER

$$Q = A\left(\frac{1.486}{n}\right) R_H^{2/3} S^{1/2}$$

WHERE: A = AREA OF FLOW $= 0.632D^2$ FROM TABLE 7-4 *

$R_H = \frac{A}{P} = 0.302D$ FROM TABLE 7-5 *

$n = .013$

* KING'S HANDBOOK OF HYDRAULICS PAGE 7-35
FOR $D/d = 0.75$

THEREFORE: $Q = 0.632D^2\left(\frac{1.486}{.013}\right)(0.302D)^{2/3} S^{1/2}$

$= 32.52\ D^2 (D^{2/3}) S^{1/2}$

$Q = 32.52\ D^{8/3} S^{1/2}$ FOR PIPES > 10" ϕ

2. DETERMINE PEAK FLOW IN EACH PIPELINE

a. LINE "A"

$Q_A = 0.71$ cfs $F = 2.8$ FROM ATTACHED GRAPH FIG. 2-5 LA CO SAN. DIST.

$Q_{AP} = 0.71\ (F)$

$Q_{AP} = 0.71\ (2.8)$

$= 1.99$ cfs

b. LINE "B"

$Q_{BT} = 0.80$ cfs F = 2.7 FROM ATTACHED GRAPH

$Q_{BP} = 0.80\ (F)$

$= 0.80\ (2.7)$

$= 2.16$ cfs

c. LINE "C"

$Q_C = Q_{AT} + Q_{BT} + Q_{CT}$ F = 2.5 FROM ATTACHED GRAPH

$= 0.71 + 0.80 + 0.32$

$= 1.83$ cfs

$Q_{CP} = 1.83\ (F)$

$= 1.83\ (2.5) = 4.58$ cfs

d. LINE "D"

$Q_{DT} = 0.42$ cfs

F = 2.9 FROM ATTACHED GRAPH

$Q_{DP} = 0.42(F)$

$= .42(2.9)$ cfs $= 1.22$ cfs

e. LINE "E"

$Q_E = Q_C + Q_{DT}$ F = 2.45 FROM ATTACHED GRAPH

$= 1.83 + 0.42$

$= 2.25$ cfs

$Q_{EP} = 2.25\ (F)$

$= 2.25\ (2.45) = 5.51$ cfs

3. DETERMINE PIPE SIZES

a. LINE A ASSUME $D > 10"\phi$

$Q = 32.52\, D^{8/3} S^{1/2}$ $S = .004$

$1.99 = 32.52\, D^{8/3} (.004)^{1/2}$

$D^{8/3} = 0.9675$

$D = 0.99$ ft $= 11.85$ INCHES USE 12" PIPE

b. LINE B ASSUME $D > 10"$

$Q = 32.52\, D^{8/3} S^{1/2}$ $S = .004$

$2.16 = 32.52\, D^{8/3} (.004)^{1/2}$

$D^{8/3} = 1.05$

$D = 1.02$ ft $= 12.2$ IN. USE 12" PIPE

C. LINE C ASSUME $D > 10"$

$Q = 32.52\, D^{8/3} S^{1/2}$ $S = .004$

$4.58 \text{cfs} = 32.52\, D^{8/3} (.004)^{1/2}$

$D^{8/3} = 2.23$

$D = 1.35$ ft $= 16.2$ IN. USE 18" PIPE

d. LINE D ASSUME $D > 10"$

$Q = 32.52\, D^{8/3} S^{1/2}$ $S = .004$

$1.22 = 32.52\, D^{8/3} (.004)^{1/2}$

$D^{8/3} = 0.5932$

$D = 0.82$ ft $= 9.87$ USE 10" PIPE

℄ LINE E ASSUME D > 10"

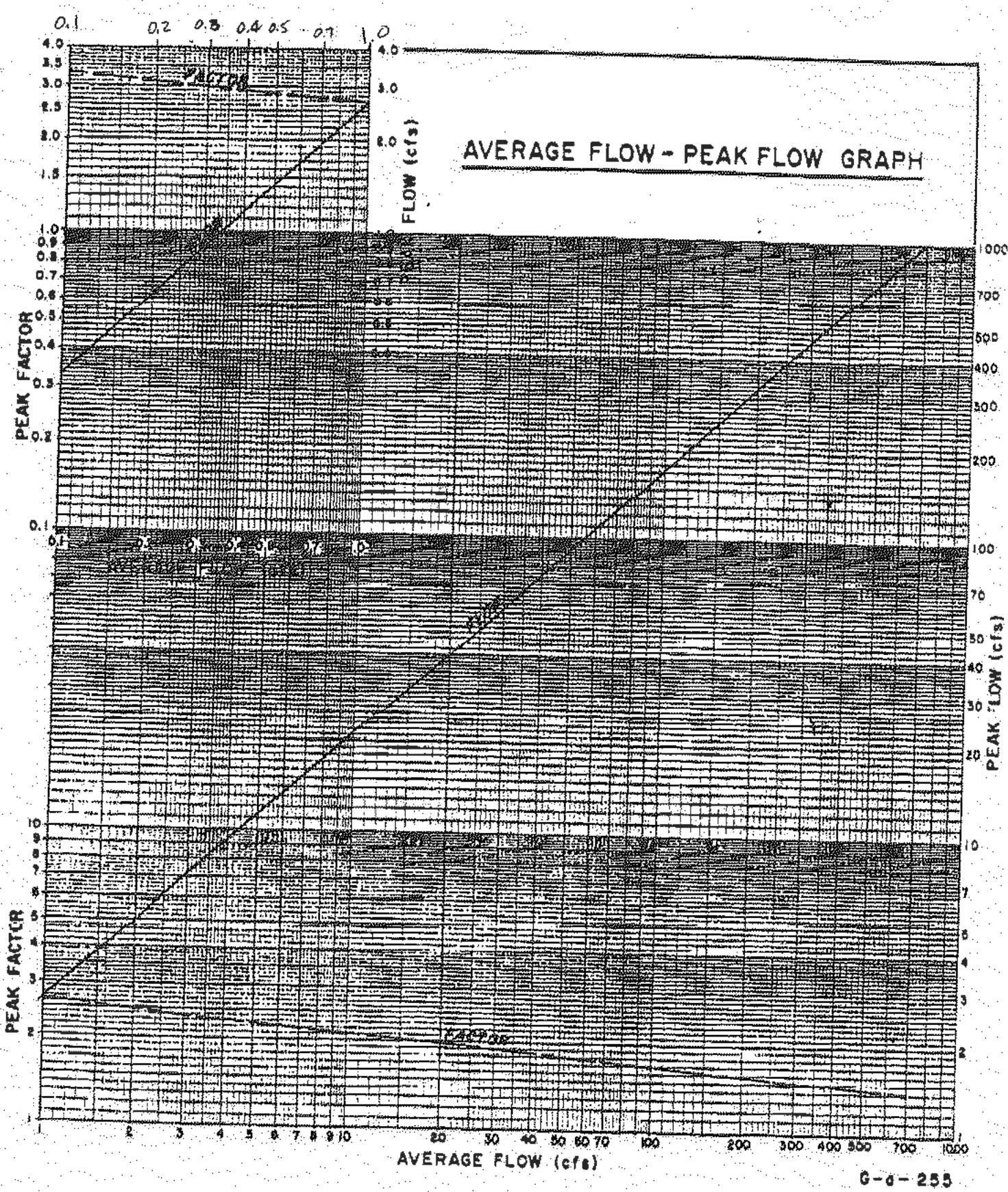
$Q = 32.52\, D^{8/3}\, S^{1/2}$ $S = .004$

$5.51 = 32.52\, D^{8/3}(.004)^{1/2}$

$D^{8/3} = 2.68$

$D = 1.45$ ft $= 17.36$ IN. USE 18" ∅ PIPE

LACO SANITATION DIST.



G-a-255

WASTEWATER RECLAMATION
SOLID WASTE MANAGEMENT

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

1955 Workman Mill Road, Whittier, CA 90601-4998
Mailing Address: P. O. Box 4998, Whittier, CA 90607-4998
Telephone: (213) 699-7411, (213) 685-5217

CHARLES W. CARRY
Chief Engineer and General Manager

October 5, 1989

File No: JOA-00.00-00

Ms. Barbara Hull
Kenneth Mullen Consulting Engineers
325 North Santa Anita Avenue
Arcadia, CA 91006

Dear Ms. Hull:

Standard Wastewater Discharge Factors

Enclosed, per your request, is a copy of the standard wastewater discharge factors used by the Sanitation Districts.

If you have any questions regarding this information, please contact the undersigned at (213) 699-7411, extension 2704.

Very truly yours,

Charles W. Carry

David B. Bruns
Supervising Civil Engineer
Financial Planning &
Property Management Section

DBB:mah

Enclosure

TABLE 1

LOADINGS FOR EACH CLASS OF LAND USE

DESCRIPTION	UNIT OF MEASURE	FLOW (Gallons per Day)	COD (Pounds per Day)	SUSPENDED SOLIDS (Pounds per Day)
RESIDENTIAL				
Single Family Home	Parcel	260	1.22	0.59
Duplex	Parcel	312	1.46	0.70
Triplex	Parcel	468	2.19	1.05
Fourplex	Parcel	624	2.92	1.40
Condominiums	Parcel	156	0.73	0.35
Single Family Home (reduced rate)	Parcel	156	0.73	0.35
Five Units or More	No. of Dwlg. Units	156	0.73	0.35
Mobile Home Parks	No. of Spaces	156	0.73	0.35
COMMERCIAL				
Hotel/Motel/Rooming House	Room	125	0.54	0.28
Store	1000 ft^2	100	0.43	0.23
Supermarket	1000 ft^2	150	2.00	1.00
Shopping Center	1000 ft^2	325	3.00	1.17
Office Building	1000 ft^2	200	0.86	0.45
Professional Building	1000 ft^2	300	1.29	0.68
Restaurant	1000 ft^2	1,000	16.68	5.00
Indoor Theatre	1000 ft^2	125	0.54	0.28
Car Wash				
Tunnel Type	1000 ft^2	3,700	15.86	8.33
Wand Type	1000 ft^2	700	3.00	1.58
Financial Institution	1000 ft^2	100	0.43	0.23
Service Shop	1000 ft^2	100	0.43	0.23
Animal Kennels	1000 ft^2	100	0.43	0.23
Service Station	1000 ft^2	100	0.43	0.23
Auto Sales/Repair	1000 ft^2	100	0.43	0.23
Wholesale Outlet	1000 ft^2	100	0.43	0.23
Nursery/Greenhouse	1000 ft^2	25	0.11	0.06
Manufacturing	1000 ft^2	200	1.86	0.70
Dry Manufacturing	1000 ft^2	25	0.23	0.09
Lumber Yard	1000 ft^2	25	0.23	0.09
Warehousing	1000 ft^2	25	0.23	0.09
Open Storage	1000 ft^2	25	0.23	0.09
Drive-in Theatre	1000 ft^2	20	0.09	0.05
Night Club	1000 ft^2	350	1.50	0.79
Bowling/Skating	1000 ft^2	150	1.76	0.55

TABLE 1

(continued)

LOADINGS FOR EACH CLASS OF LAND USE

DESCRIPTION	UNIT OF MEASURE	FLOW (Gallons per Day)	COD (Pounds per Day)	SUSPENDED SOLIDS (Pounds per Day)
COMMERCIAL				
Club	1000 ft²	37	0.16	0.08
Auditorium, Amusement	1000 ft²	350	1.50	0.79
Golf Course, Camp, and Park (Structures and Improvements)	1000 ft²	100	0.43	0.23
Convalescent Home	Bed	125	0.54	0.28
Laundry	1000 ft²	3,825	16.40	8.61
Mortuary/Cemetery	1000 ft²	100	1.33	0.67
Health Spa, Gymnasium				
With Showers	1000 ft²	600	2.58	1.35
Without Showers	1000 ft²	300	1.29	0.68
Convention Center, Fairground, Racetrack, Sports Stadium/Arena	Average Daily Attendance	10	0.04	0.02
INSTITUTIONAL				
College/University	Student	20	0.09	0.05
Private School	1000 ft²	200	0.86	0.45
Church (noncharitable)	1000 ft²	50	0.21	0.11

Table 7-3. For Determining the Vertical Distance $\bar{y}$ below the Water Surface to the Center of Gravity of a Cross Section of a Trapezoidal Channel

Let $\frac{\text{depth of water}}{\text{bottom width of channel}} = \frac{D}{b}$ and $C_{\bar{y}}$ = tabulated value. Then $\bar{y} = C_{\bar{y}} D$.

$\frac{D}{b}$	Side slopes of channel, ratio of horizontal to vertical									
	⅛–1	¼–1	⅜–1	½–1	1–1	1½–1	2–1	2½–1	3–1	4–1
0.05	.499	.498	.496	.494	.492	.488	.485	.481	.478	.472
.1	.498	.496	.492	.488	.485	.478	.472	.467	.462	.452
.15	.497	.494	.488	.483	.478	.469	.462	.455	.448	.438
.2	.496	.492	.485	.478	.472	.462	.452	.444	.438	.426
.25	.495	.490	.481	.474	.467	.455	.444	.436	.429	.417
.3	.494	.488	.478	.469	.462	.448	.438	.429	.421	.409
.35	.493	.487	.475	.465	.457	.443	.431	.422	.415	.403
.4	.492	.485	.472	.462	.452	.438	.426	.417	.409	.397
.45	.491	.483	.469	.458	.448	.433	.421	.412	.404	.393
.5	.490	.481	.467	.455	.444	.429	.417	.407	.400	.389
.6	.488	.478	.462	.448	.438	.421	.409	.400	.393	.382
.7	.487	.475	.457	.443	.431	.415	.403	.394	.387	.377
.8	.485	.472	.452	.438	.426	.409	.397	.389	.382	.373
.9	.483	.469	.448	.433	.421	.404	.393	.385	.378	.370
1.0	.481	.467	.444	.429	.417	.400	.389	.381	.375	.367
1.1	.480	.464	.441	.425	.413	.396	.385	.378	.372	.364
1.2	.478	.462	.438	.421	.409	.393	.382	.375	.370	.362
1.3	.477	.459	.434	.418	.406	.390	.380	.373	.367	.360
1.4	.475	.457	.431	.415	.403	.387	.377	.370	.365	.359
1.5	.474	.455	.429	.412	.400	.385	.375	.368	.364	.357
1.6	.472	.452	.426	.409	.397	.382	.373	.367	.362	.356
1.7	.471	.450	.423	.407	.395	.380	.371	.365	.361	.355
1.8	.469	.448	.421	.404	.393	.378	.370	.364	.359	.354
1.9	.468	.446	.419	.402	.391	.377	.368	.362	.358	.353
2.0	.467	.444	.417	.400	.389	.375	.367	.361	.357	.352

Table 7-4. For Determining the Area a of the Cross Section of a Circular Conduit Flowing Part Full

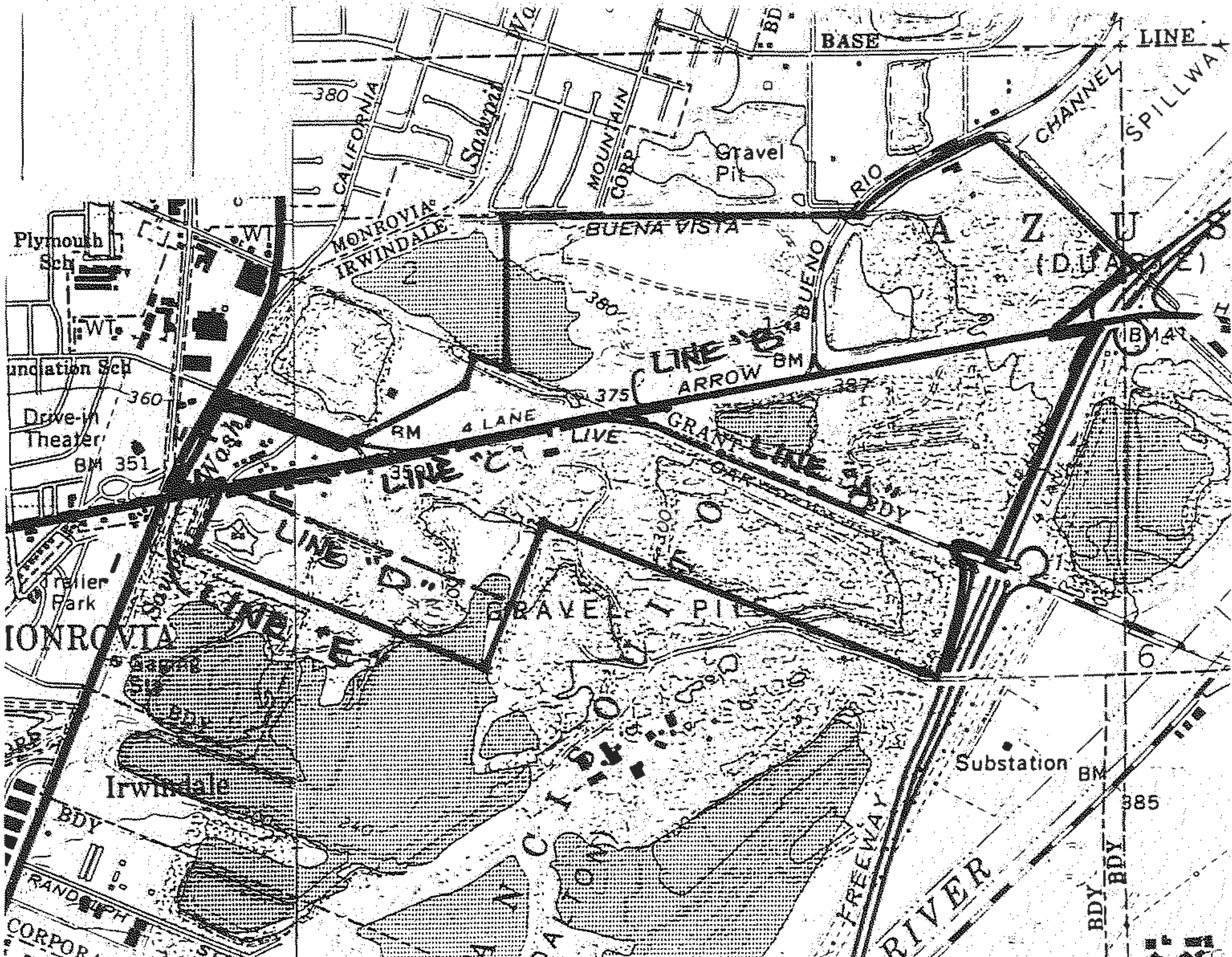
Let $\frac{\text{depth of water}}{\text{diameter of channel}} = \frac{D}{d}$ and C_a = the tabulated value. Then $a = C_a d^2$.

$\frac{D}{d}$	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.0000	.0013	.0037	.0069	.0105	.0147	.0192	.0242	.0294	.0350
.1	.0409	.0470	.0534	.0600	.0668	.0739	.0811	.0885	.0961	.1039
.2	.1118	.1199	.1281	.1365	.1449	.1535	.1623	.1711	.1800	.1890
.3	.1982	.2074	.2167	.2260	.2355	.2450	.2546	.2642	.2739	.2836
.4	.2934	.3032	.3130	.3229	.3328	.3428	.3527	.3627	.3727	.3827
.5	.393	.403	.413	.423	.433	.443	.453	.462	.472	.482
.6	.492	.502	.512	.521	.531	.540	.550	.559	.569	.578
.7	.587	.596	.605	.614	.623	.632	.640	.649	.657	.666
.8	.674	.681	.689	.697	.704	.712	.719	.725	.732	.738
.9	.745	.750	.756	.761	.766	.771	.775	.779	.782	.784

Table 7-5. For Determining the Hydraulic Radius r of the Cross Section of a Circular Conduit Flowing Part Full

Let $\frac{\text{depth of water}}{\text{diameter of channel}} = \frac{D}{d}$ and C_r = the tabulated value. Then $r = C_r d$.

$\frac{D}{d}$	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.000	.007	.013	.020	.026	.033	.039	.045	.051	.057
.1	.063	.070	.075	.081	.087	.093	.099	.104	.110	.115
.2	.121	.126	.131	.136	.142	.147	.152	.157	.161	.166
.3	.171	.176	.180	.185	.189	.193	.198	.202	.206	.210
.4	.214	.218	.222	.226	.229	.233	.236	.240	.243	.247
.5	.250	.253	.256	.259	.262	.265	.268	.270	.273	.275
.6	.278	.280	.282	.284	.286	.288	.290	.292	.293	.295
.7	.296	.298	.299	.300	.301	.302	.302	.303	.304	.304
.8	.304	.304	.304	.304	.304	.303	.303	.302	.301	.299
.9	.298	.296	.294	.292	.289	.286	.283	.279	.274	.267


BASE LINE
SPILLWAY
CHANNEL
RIO
Gravel Pit
MOUNTAIN
CORP
California
380
MONROVIA
IRWINDALE
BUENA VISTA
BUENO
AZU
(DUARTE)
LINE "B"
ARROW
BM
375
380
387
BM 41
4 LANE
LIVE
GRANT LINE
LINE "A"
LINE "C"
350
LINE "D"
LINE "E"
GRAVEL PIT
OAK
BDY
Plymouth Sch
WT
Foundation Sch
360
Drive-in Theater
BM 351
Wash
Trailer Park
MONROVIA
Irwindale
BDY
RANDOLPH
CORPORA
FREEWAY
RIVER
Substation
BM
385
BDY
6

SUBDIVISION OF THE RANCHO AZUSA DE DUANTE

CODE
3424

M.R. 6 - 80 - 82

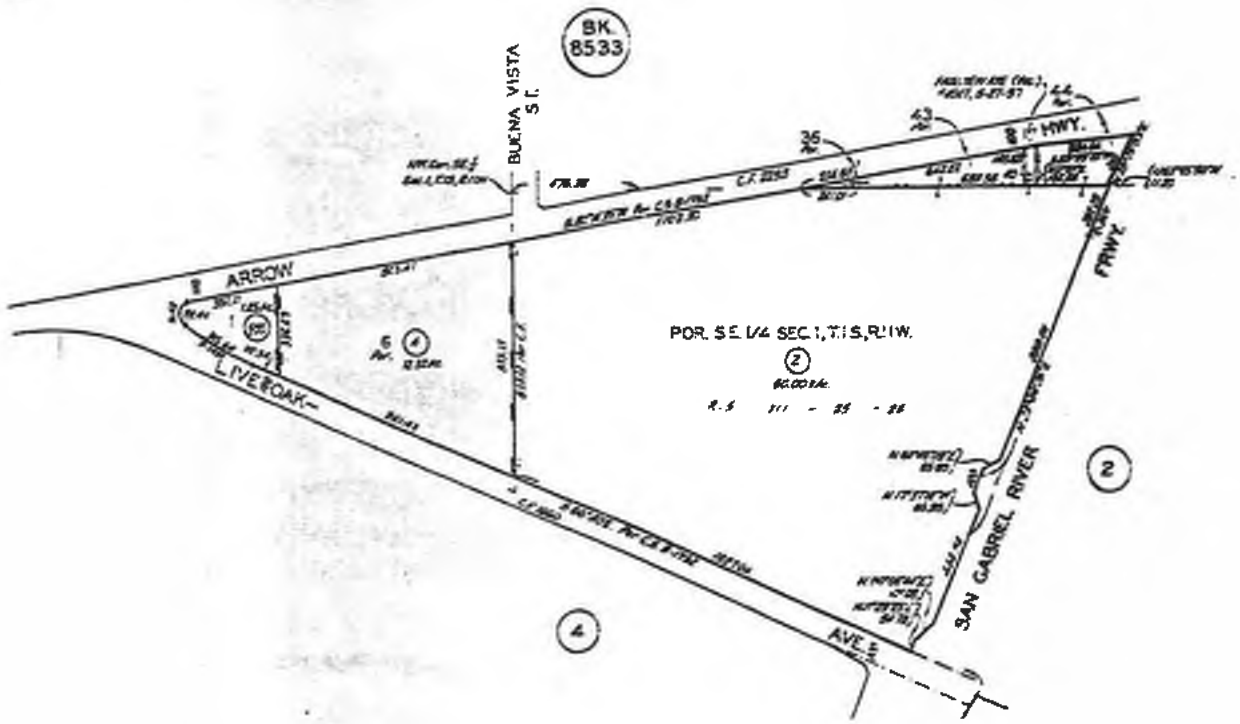
POR. SEC. 36, T.1N., R.11W.

FOR PREV. ASSMT. SEE: 1370 - 32

ASSESSOR'S MAP
COUNTY OF LOS ANGELES, CALIF.

8532 | 1

SCALE 1" = 400'

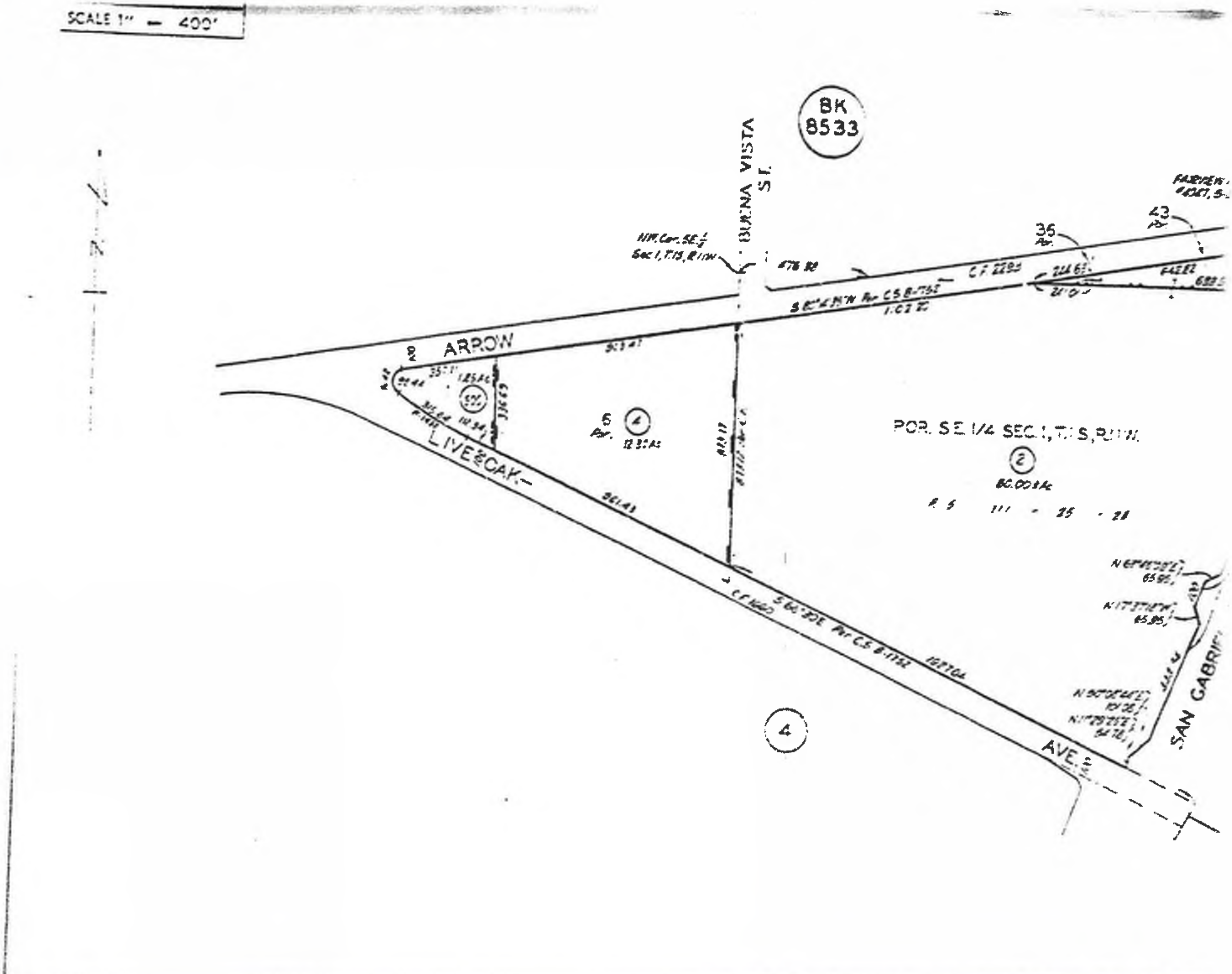


PARCEL MAP ____ P.M. 198 - 77-78

AZUSA RANCHO FINALLY
CONFIRMED TO ANDREAS DUARTE P.2-560-561

SUBDIVISION OF THE

All 905 series parcels on this page are assessed to the Irwindale Community Redevelopement Agency, unless otherwise noted.


SCALE 1" — 400'
N
BK
8533
BUENA VISTA
ST.
ARROW
LIVE OAK
AVE.
SAN GABRIEL
POR. S.E. 1/4 SEC. 1, T.1 S, R.11 W.
2
4
5
Por.
36
Por.
43
Por.

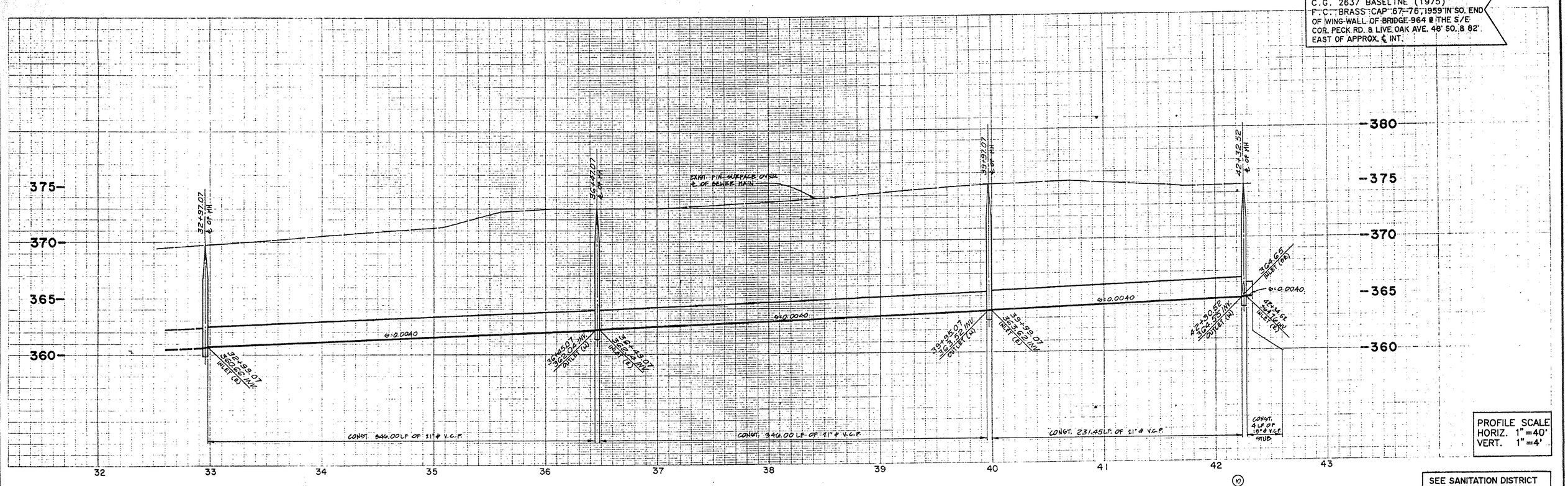
Live Oak Sanitary Sewer Improvement Plans

Appendix F

As-Built Plans

BENCHMARK ELEV. 353.87

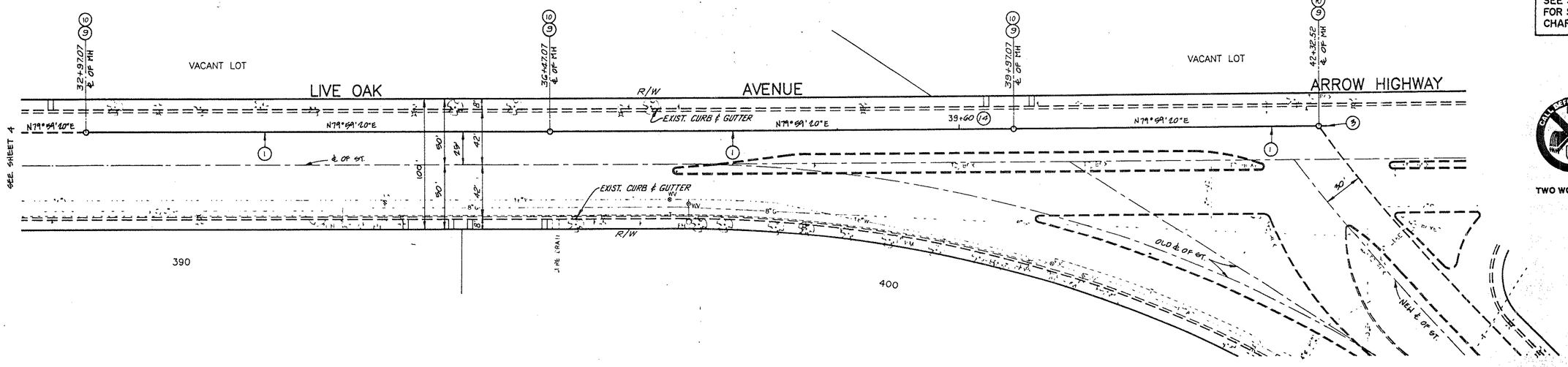
C.G. 2637 BASELINE (1975)
F.C. BRASS CAP 67-76, 1959 IN SO. END OF WING-WALL OF BRIDGE 964 @ THE S/E COR. PECK RD. & LIVE OAK AVE. 48' SO. & 82' EAST OF APPROX. ℄ INT.



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

SEE SANITATION DISTRICT FOR SPECIAL CONNECTION CHARGES. (310) 699-7411 Extension 2713

SCALE: 1"=40'



Underground Service Alert of Southern California
Call: TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

NOTE:
THE EXISTENCE & LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS DRAWING. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN & ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS. HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

Carlos Alvarado 11/13/92
CITY ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER KENNETH I. MULLEN No. 9692 Exp. 12/31/92 CIVIL STATE OF CALIFORNIA

APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO - CITY ENGINEER
BY: Carlos Alvarado C19857 R.C.E. DATE: 11/13/92

REV.	DATE	BY	DESCRIPTION

SUBMITTED: Kenneth I. Mullen 9692 R.C.E. 9/24/92 DATE
FOR THE CONSULTANT
APPROVED: DATE

DESIGNED: R.S.
DRAWN: R.S.
CHECKED: K.I.M.

SCALE: AS SHOWN

KENNETH I. MULLEN, CONSULTING ENGINEERS, INC.
ARCADIA
(818) 445-2212

CITY OF IRWINDALE
LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS
FROM STA. 32+97.07 TO STA. 42+32.52

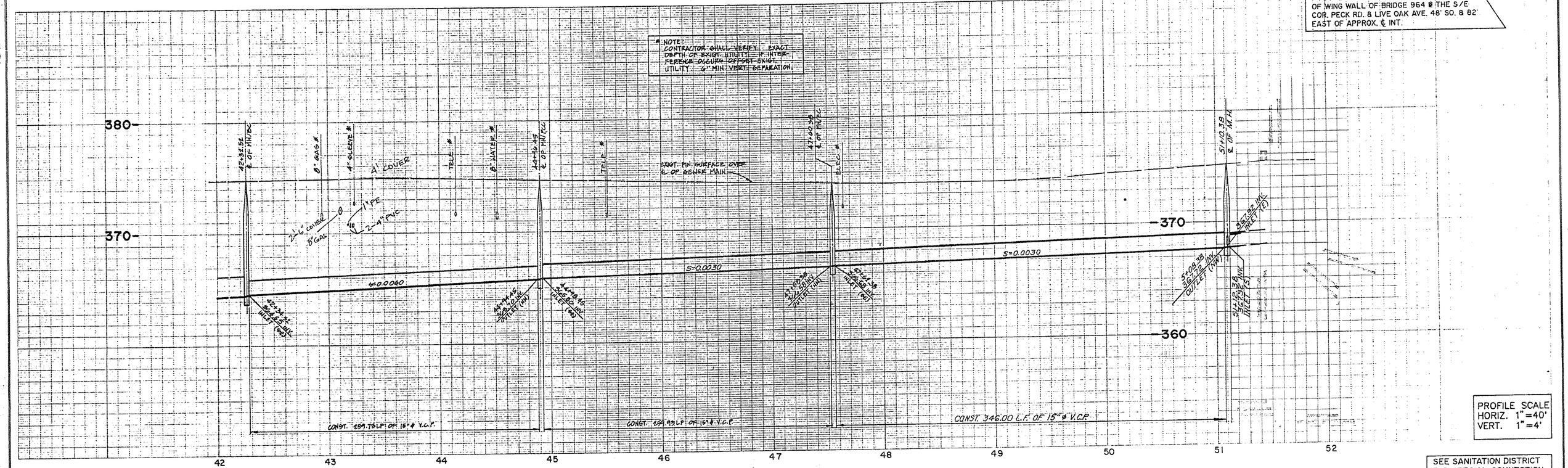
SHEET 5 OF 8 SHEETS

Std. 6.02 - 2/82

BENCHMARK ELEV. 353.87

C.G. 2637 BASELINE (1975)
F.C. BRASS CAP 67-76, 1959 IN SO. END OF WING WALL OF BRIDGE 964 @ THE S/E COR. PECK RD. & LIVE OAK AVE. 48' SO. & 82' EAST OF APPROX. ℄ INT.

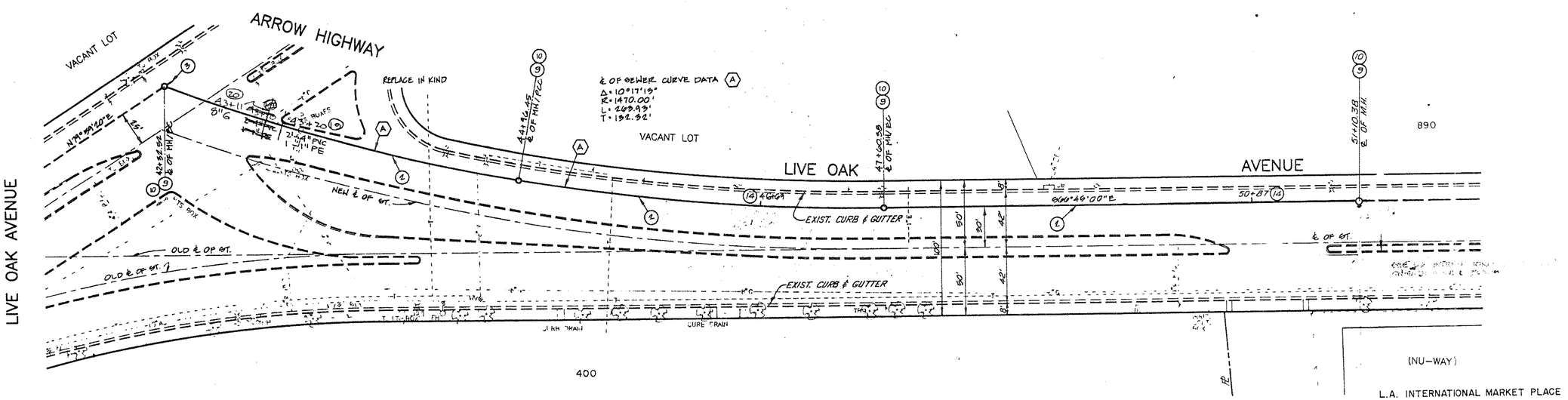
* NOTE:
CONTRACTOR SHALL VERIFY EXACT DEPTH OF EXIST. UTILITY IF INTERFERENCE FIGURE 12" OR LESS. EXIST. UTILITY 6" MIN. VERT. SEPARATION.



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

SEE SANITATION DISTRICT FOR SPECIAL CONNECTION CHARGES. (310) 699-7411 Extension 2713

SCALE: 1"=40'



Underground Service Alert of Southern California
Call: TOLL FREE
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422-4133
TWO WORKING DAYS BEFORE YOU DIG

NOTE:
THE EXISTENCE & LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS DRAWING. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN & ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS. HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

Carlos Alvarado 11/13/92
CITY ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
KENNETH T. MULLEN
No. 9692
Exp. 12/31/92
CIVIL
STATE OF CALIFORNIA

APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO, CITY ENGINEER
BY: Carlos Alvarado R.C.E. 23857 DATE: 11/13/92

REV.	DATE	BY	DESCRIPTION

SUBMITTED: Kenneth T. Mullen 9692 R.C.E. 9/20/92 DATE
FOR THE CONSULTANT
APPROVED: DATE

DESIGNED: R.S.
DRAWN: R.S.
CHECKED: K.I.M.

SCALE: AS SHOWN

KENNETH I. MULLEN, CONSULTING ENGINEERS, INC.
ARCADIA
(818) 445-2212

CITY OF IRWINDALE
LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS
FROM STA. 42+32.52 TO STA. 51+59.50.

SHEET 6 OF 8 SHEETS

Std. 8.02 8/82

NOTE
CONTRACTOR SHALL VERIFY EXACT DEPTH OF EXIST. UTILITIES IF INTERFERENCE OCCURS OFFSET EXIST. UTILITIES. 6" MIN. SEPERATION.

BENCHMARK ELEV. 353.87
C.G. 2637 BASELINE (1975)
F.C. BRASS CAP 67-76, 1959 IN SO. END OF WING WALL OF BRIDGE 964 @ THE S/E COR. PECK RD. & LIVE OAK AVE. 48' SO. & 82' EAST OF APPROX. ℄ INT.

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

SEE SANITATION DISTRICT FOR SPECIAL CONNECTION CHARGES. (310) 699-7411 Extension 2713

CONSTRUCTION NOTES

2. CONSTRUCT 15" DIA. EXTRA STRENGTH V.C.P. TYPE "G" JOINTS PER S.S.P.W.C. SECTION 207-8 & 208-2.
3. CONSTRUCT 4 L.F. OF 12" DIA. V.C.P. STUB & PLUG END.
9. CONSTRUCT STD. MANHOLE PER L.A.C.D.P.W. STD. 2003-0.
10. CONSTRUCT MANHOLE FRAME & COVER PER APWA STD. PLAN 210
16. 15" X 8" TEE V.C.P. PER LACDPWSTD 2024-0.
17. CONSTRUCT CLEANOUT
18. CONSTRUCT 8" DIA VCP

NOTE:
THE EXISTENCE & LOCATION OF UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS DRAWING. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN & ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS. HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

CITY ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
BARBARA L. HALL
No. 42206
Exp. 03/31/96
CIVIL
STATE OF CALIFORNIA

APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO - CITY ENGINEER
BY: C19857 R.C.E. DATE

SUBMITTED:
FOR THE CONSULTANT 42206 R.C.E. DATE
APPROVED: DATE

REV.	DATE	BY	DESCRIPTION

DESIGNED: B.L.H.
DRAWN: I.C.
CHECKED: B.L.H.

SCALE:
1"=40' HORIZ.
1"=4' VERT.

CIVILTEC engineering inc.
855 WEST FOOTHILL BLVD.
MONROVIA, CA. 91016
(818) 357-0588

CITY OF IRWINDALE
LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS
FROM STA. 51+10.38 TO STA. 60+76.38

SHEET 7 OF 8 SHEETS

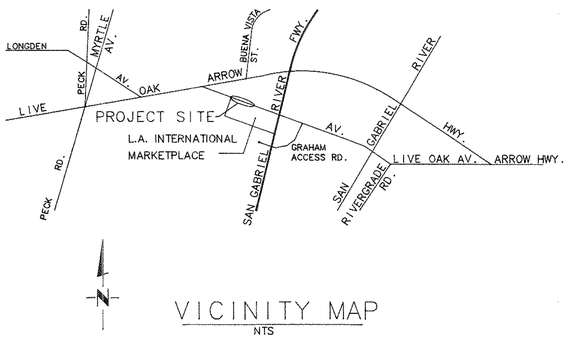
RIVERSIDE BLUEPRINT - RIVERSIDE, CALIF.

CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA

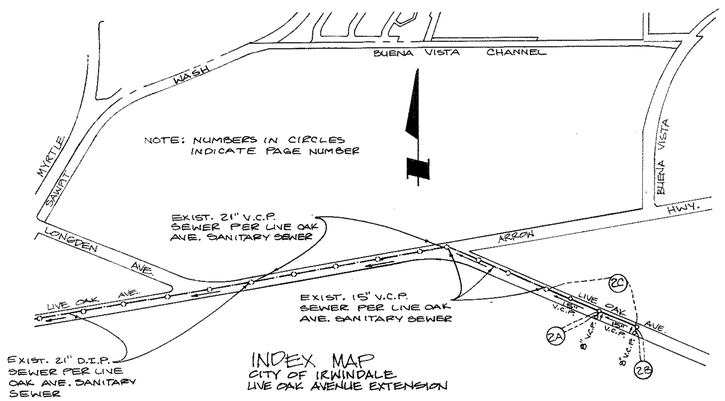
SEWER IMPROVEMENTS
IN
LIVE OAK AVENUE
FROM STATION 51+10.38 TO STATION 59+28.38

BENCHMARK ELEV. 353.87

C.G. 2637 BASELINE (1975)
F.C. BRASS CAP 67-76, 1959 IN S END OF WING WALL OF BRIDGE 964 @ THE S/E COR. PECK RD. & LIVE OAK AVE. 48' S & 82' E OF APPROX CLINT.



VICINITY MAP
NTS



INDEX MAP
CITY OF IRWINDALE
LIVE OAK AVENUE EXTENSION

PARCEL MAP No. 16615 & 21968

SCALE: 1"=600'

LIST OF DRAWINGS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	PLAN & PROFILE

GENERAL NOTES

1 ALL WORK SHALL BE PERFORMED IN STRICT CONFORMANCE WITH THE CURRENT STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. 1992 EDITION AND ALL SUPPLEMENTS APPURTENANT THERETO AND LACDPW STANDARD DRAWINGS LATEST EDITION.

2 ANY CONTRACTOR PERFORMING WORK ON THIS PROJECT SHALL FAMILIARIZE HIMSELF WITH THE SITE AND SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM HIS OPERATIONS, WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.

3 ALL OBSTRUCTIONS WITHIN THE AREA TO BE IMPROVED ARE TO BE REMOVED AND/OR RELOCATED AT THE DIRECTION OF THE CITY ENGINEER. UTILITIES SHALL BE RELOCATED BY THEIR RESPECTIVE OWNERS. THE CONTRACTOR IS REFERRED TO SECTION 5 OF THE STANDARD SPECIFICATIONS.

4 UTILITY LINE LOCATIONS WERE TAKEN FROM RECORD AND WERE NOT LOCATED IN THE FIELD, UNLESS OTHERWISE NOTED ON THE PLAN. THE CONTRACTOR IS REFERRED TO SECTION 5 OF THE STANDARD SPECIFICATIONS.

5 ALL WORK SHALL CONFORM TO THE PROVISIONS OF CONSTRUCTION SAFETY ORDERS ISSUED BY THE STATE DIVISION OF INDUSTRIAL SAFETY. IN CASE OF ANY ACCIDENTS INVOLVING SAFETY MATTERS COVERED BY SECTION 6424 OF THE CALIFORNIA LABOR CODE, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE STATE DIVISION OF INDUSTRIAL SAFETY.

6 CALL UNDERGROUND SERVICE ALERT FOR UNDERGROUND LOCATIONS 48 HOURS BEFORE YOU DIG AND PAVE AT (800) 422-4133.

7 THE CONTRACTOR SHALL OBTAIN A NO-FEE TRAFFIC CONTROL PERMIT 48 HOURS PRIOR TO TIME OF CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR IS REFERRED TO SECTION 7-10.3 OF THE STANDARD SPECIFICATIONS.

8 THE CONTRACTOR SHALL RENEW OR REPLACE ANY EXISTING TRAFFIC STRIPING AND/OR PAVEMENT MARKINGS WHICH HAVE BEEN EITHER REMOVED OR THE EFFECTIVENESS OF WHICH HAS BEEN REDUCED AS A RESULT OF HIS OPERATIONS. RENEWAL OF PAVEMENT STRIPING AND MARKINGS SHALL BE DONE IN CONFORMANCE WITH SECTION 310-5.6 OF THE STANDARD SPECIFICATIONS.

9 ALL SEWER MAINS SHALL BE EXTRA STRENGTH VITRIFIED CLAY PIPE (V.C.P.) UNLESS OTHERWISE SHOWN AND APPROVED BY THE CITY ENGINEER.

10 PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF EXISTING SEWER MAIN(S) AND NOTIFY THE DESIGN ENGINEER OF ANY VARIATION FROM DESIGN.

11 ALL MANHOLES ARE CONSIDERED A CONFINED SPACE WHERE TOXIC FUMES MAY COLLECT. THE CONTRACTOR SHALL FOLLOW ALL CAL-OSHA REGULATIONS WHILE WORKING IN SUCH CONFINED SPACES INCLUDING THE USE OF BREATHING APPARATUS WHERE FOUND NECESSARY.

12 CONSTRUCTION OF NEW SEWER MAIN SHALL BE DONE IN ACCORDANCE WITH STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES CRITERIA FOR SEPARATION OF WATER MAINS AND SANITARY SEWERS. THE PLANS INDICATE THE CASE AND ZONE UNDER THESE QUIDELINES DETERMINED BY A SEARCH OF AVAILABLE UTILITY RECORDS. SHOULD THE CONTRACTOR ENCOUNTER CONDITIONS WHICH REQUIRE A MODIFICATION OF THE STATED CASE AND ZONE IN THE FIELD, HE SHALL IMMEDIATELY BRING IT TO THE ATTENTION OF THE CITY ENGINEER.

13 LEAKAGE TESTS SHALL BE PERFROMED ON ALL SEWERS AS SPECIFIED IN S.S.P.W.C. SECTION 306-1.4.4

14 TRAFFIC CONTROL WILL BE PROVIDED IN ACCORDANCE WITH THE SPECIAL PROVISIONS OF THE CITY OF IRWINDALE

NO CONNECTION FOR THE DISPOSAL OF INDUSTRIAL WASTES SHALL BE MADE TO SEWERS SHOWN ON THESE DRAWINGS UNTIL A PERMIT FOR INDUSTRIAL WASTEWATER DISCHARGE HAS BEEN ISSUED BY THE SANITATION DISTRICTS FOR SAID CONNECTION.

THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS. HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

Carlos Alvarado 4/6/93
CITY ENGINEER DATE

APPROVED – CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO – CITY ENGINEER
Carlos Alvarado C10857 4/6/93
RCE DATE

REVISIONS			
NO.	DESCRIPTION	APP.	DATE

REGISTERED PROFESSIONAL ENGINEER
BARBARA L. HALL
No. 42206
Exp. 03/31/96
CIVIL
STATE OF CALIFORNIA

SUBMITTED:
Barbara L Hall 42206 3/10/93
BY THE CONSULTANT RCE DATE

CIVILTEC
engineering inc.
(818) 357-0588

CITY OF IRWINDALE

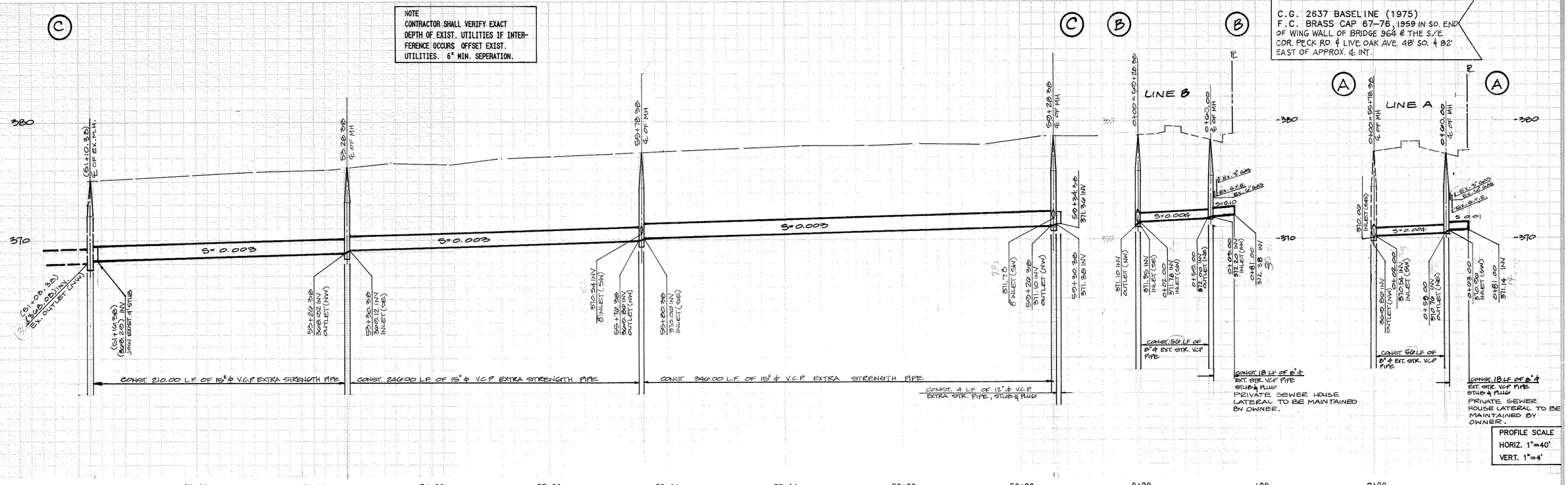
LIVE OAK AVE. SANITARY SEWER
PARCEL MAPS 16615 AND 21968
TITLE SHEET

DESIGN: BLH	CHECKED:	SCALE: NONE
DRAWN: IC	J.N. 92-206	SHEET 1 OF 2

P3

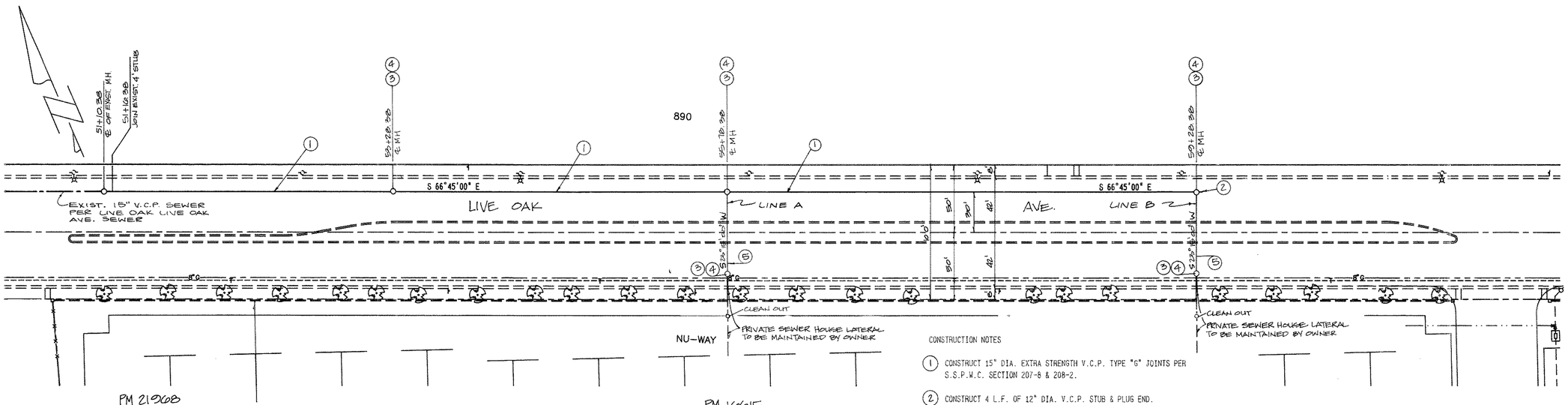
NOTE
CONTRACTOR SHALL VERIFY EXACT DEPTH OF EXIST. UTILITIES IF INTERFERENCE OCCURS OFFSET EXIST. UTILITIES. 6" MIN. SEPERATION.

BENCHMARK ELEV. 353.87
C.G. 2637 BASELINE (1975)
F.C. BRASS CAP 67-76, 1959 IN SO. END OF WING WALL OF BRIDGE 964 @ THE S/E. COR. PECK RD. & LIVE OAK AVE. 48' SO. & 82' EAST OF APPROX. & INT.



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

SEE SANITATION DISTRICT FOR SPECIAL CONNECTION CHARGES. (310) 699-7411 Extension 2713



CONSTRUCTION NOTES

1. CONSTRUCT 15" DIA. EXTRA STRENGTH V.C.P. TYPE "G" JOINTS PER S.S.P.W.C. SECTION 207-8 & 208-2.
2. CONSTRUCT 4 L.F. OF 12" DIA. V.C.P. STUB & PLUG END.
3. CONSTRUCT STD. MANHOLE PER L.A.C.D.P.W. STD. 2001-0.
4. CONSTRUCT MANHOLE FRAME & COVER PER APWA STD. PLAN 210-1.
5. CONSTRUCT 8" DIA. EXTRA STRENGTH VCP W/ TYPE "G" JOINTS PER S.S. P.W.C. SECTIONS 207-8 & 208-2.

NOTE:
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REGISTERED PROFESSIONAL ENGINEER
BARBARA L. HALL
No. 42206
Exp. 03/31/96
CIVIL
STATE OF CALIFORNIA

APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO - CITY ENGINEER
BY _____ C10857 R.C.E. 4/6/93 DATE

SUBMITTED: _____ 42206 R.C.E. 3/10/93 DATE

REV.	DATE	BY	DESCRIPTION

DESIGNED: B.L.H.
DRAWN: I.C.
CHECKED: B.L.H.

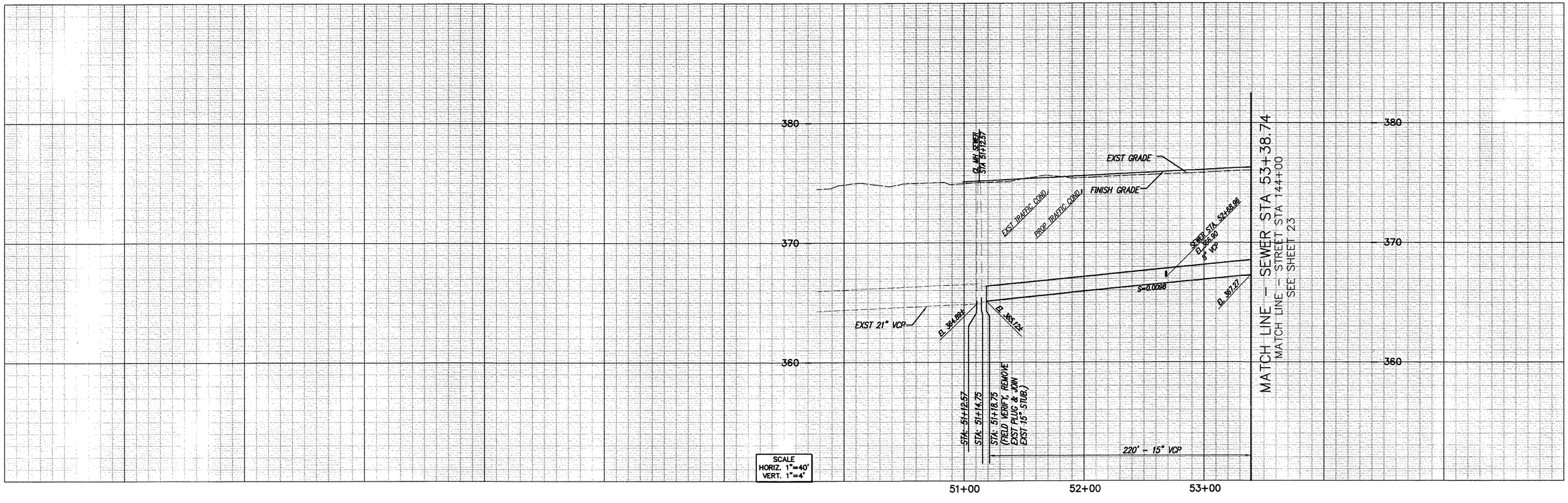
SCALE:
1"=40' HORIZ.
1"=4' VERT.

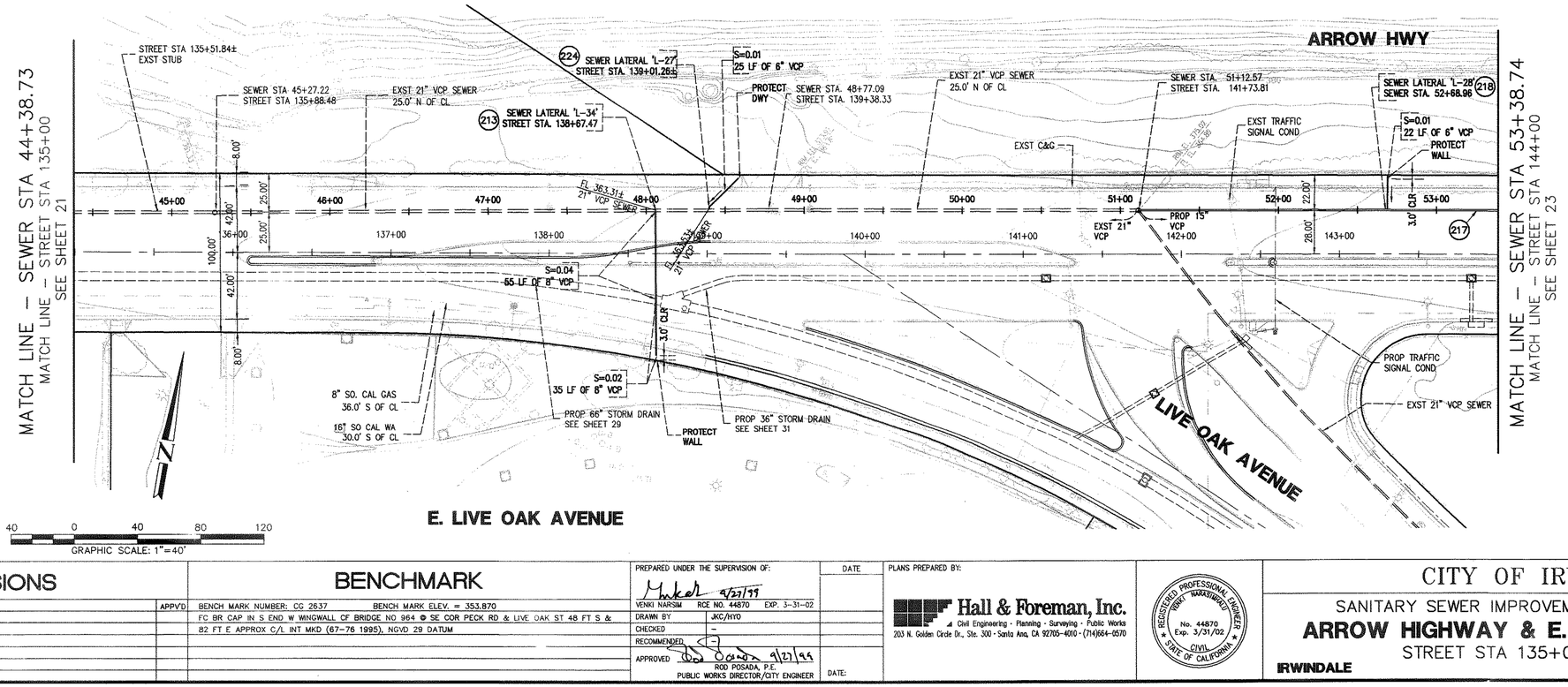
CIVILTEC engineering inc.
855 WEST FOOTHILL BLVD.
MONROVIA, CA. 91016
(818) 357-0588

CITY OF IRWINDALE

LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS
PARCEL MAPS 16615 AND 21568
FROM STA. 51+10.38 TO STA. 59+28.38

SHEET 2 OF 2 SHEETS





SCALE
HORIZ. 1"=40'
VERT. 1"=4'

CONSTRUCTION NOTES:

(213) INSTALL SADDLE PER LACDPW STD 2025-1 & 8" VCP LATERAL PER STD 222-1
(217) CONST 15" VCP
(218) CONST 6" SEWER LATERAL PER STD 222-1
(224) REMOVE EXST CAP & INSTALL 6"-1/16 BEND & 6" VCP LATERAL PER STD 222-1

REVISIONS

NO.	DATE	INIT.		APPVD

BENCHMARK

BENCH MARK NUMBER: CG 2637 BENCH MARK ELEV. = 353.870
FC BR CAP IN S END W WINGWALL OF BRIDGE NO 964 @ SE COR PECK RD & LIVE OAK ST 48 FT S & 82 FT E APPROX C/L INT MKD (67-76 1995), NGVD 29 DATUM

PREPARED UNDER THE SUPERVISION OF:
VENKI NARSIM RCE NO. 44870 EXP. 3-31-02 — 9/27/99
DRAWN BY JKC/HYO
CHECKED -
RECOMMENDED -
APPROVED ROD POSADA, P.E. PUBLIC WORKS DIRECTOR/CITY ENGINEER — 9/27/99
DATE:

PLANS PREPARED BY:
Hall & Foreman, Inc.
Civil Engineering · Planning · Surveying · Public Works
203 N. Golden Circle Dr., Ste. 300 · Santa Ana, CA 92705-4010 · (714)564-0570

REGISTERED PROFESSIONAL ENGINEER VENKI NARSIM No. 44870 Exp. 3/31/02 CIVIL STATE OF CALIFORNIA

CITY OF IRWINDALE

SANITARY SEWER IMPROVEMENT PLAN & PROFILE

ARROW HIGHWAY & E. LIVE OAK AVENUE

STREET STA 135+00 TO 144+00

IRWINDALE CALIFORNIA

SHT 22 OF 73

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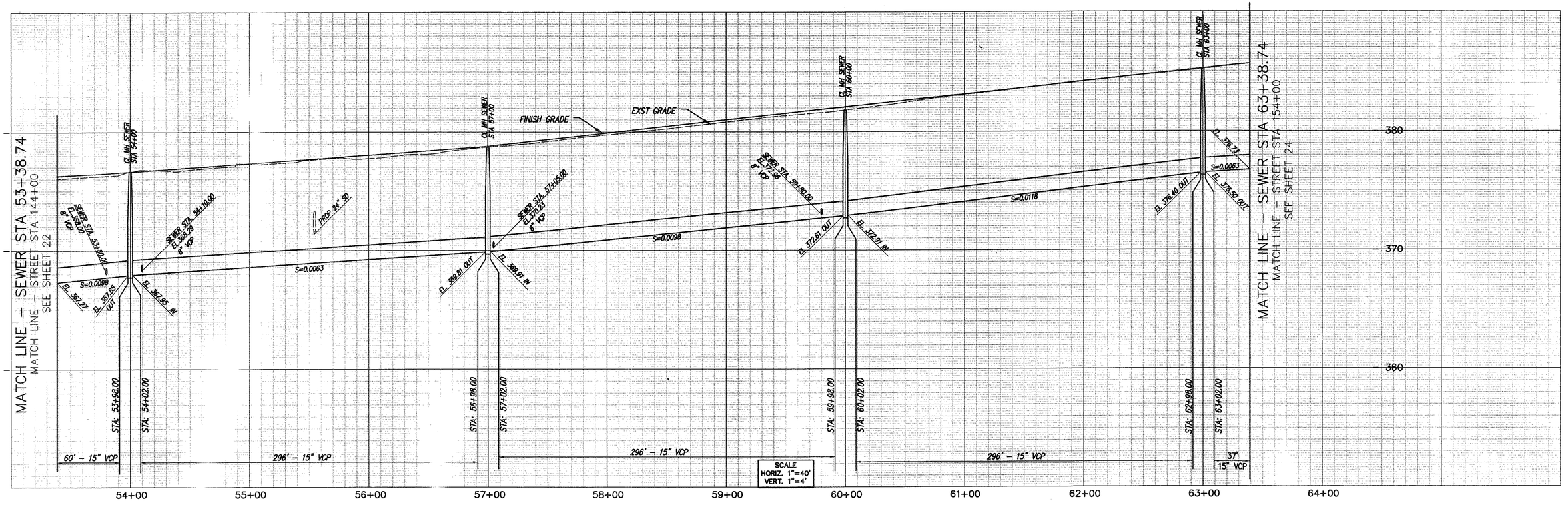

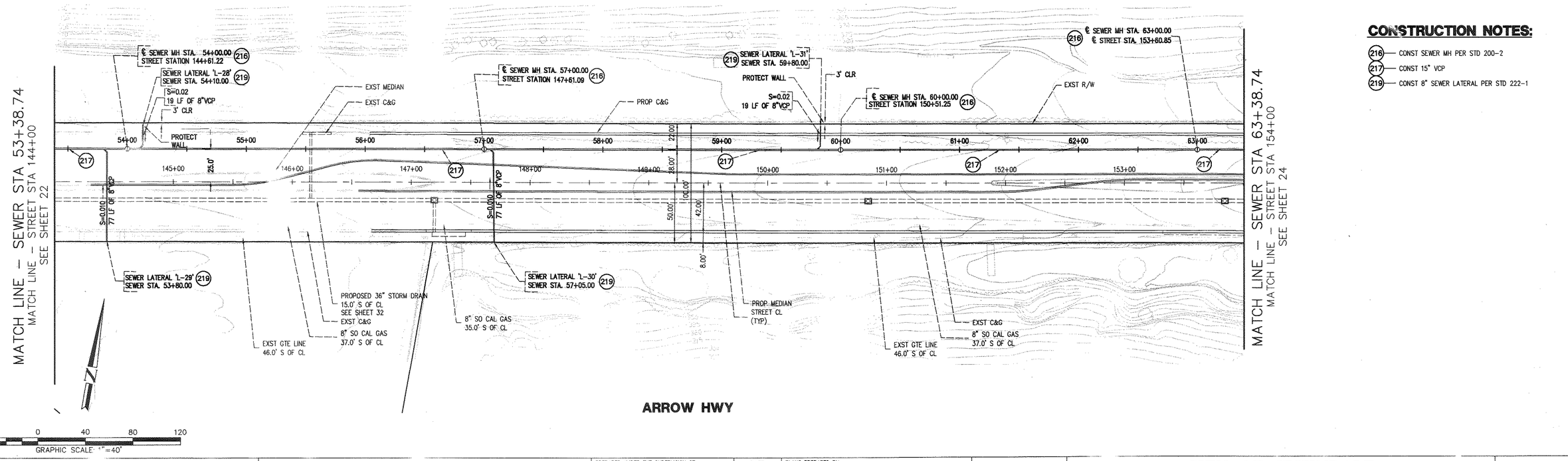

CONSTRUCTION NOTES:

(216) — CONST SEWER MH PER STD 200-2
(217) — CONST 15" VCP
(219) — CONST 8" SEWER LATERAL PER STD 222-1

REVISIONS				BENCHMARK	PREPARED UNDER THE SUPERVISION OF:	DATE
NO.	DATE	INIT.	APP'D	BENCH MARK NUMBER: CG 2637 BENC	V. = 353.870	VENKI NARSIM RCE NO. 44870 EXP. 3-31-02	9/27/99
				FC BR CAP IN S END W WINGWALL OF BRIDGE N	OR PECK RD & LIVE OAK ST 48 FT S &	DRAWN BY JKC/HYO	
				82 FT E APPROX C/L INT MKD (67-76 1995), N	M	CHECKED –	
						RECOMMENDED	
						APPROVED 9/27/99 ROD POSADA, P.E. PUBLIC WORKS DIRECTOR/CITY ENGINEER	DATE:

PLANS PREPARED BY:
Hall & Foreman, Inc.
Civil Engineering - Planning - Surveying - Public Works
203 N. Golden Circle Dr., Ste. 300 - Santa Ana, CA 92705-4010 - (714)564-0570

REGISTERED PROFESSIONAL ENGINEER HENRY HARSTWOOD No. 44870 Exp. 3/31/02 CIVIL STATE OF CALIFORNIA

CITY OF IRWINDALE

SANITARY SEWER IMPROVEMENT PLAN & PROFILE

ARROW HIGHWAY & E. LIVE OAK AVENUE

STREET STA 144+00 TO 154+00

IRWINDALE CALIFORNIA

23 OF 73

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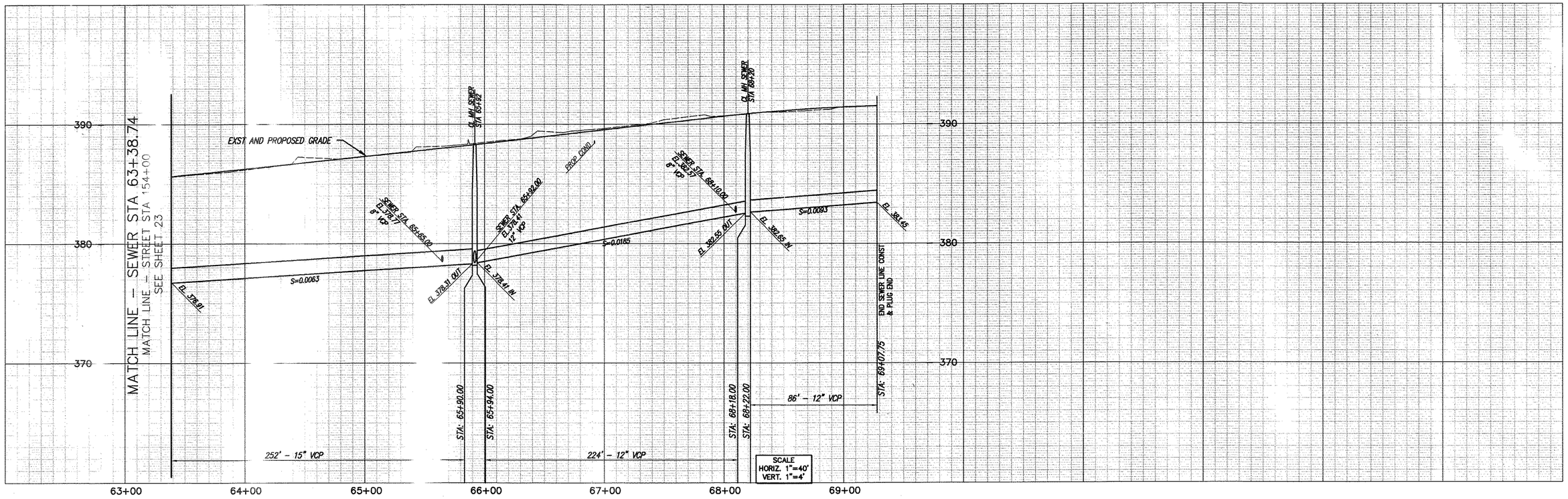
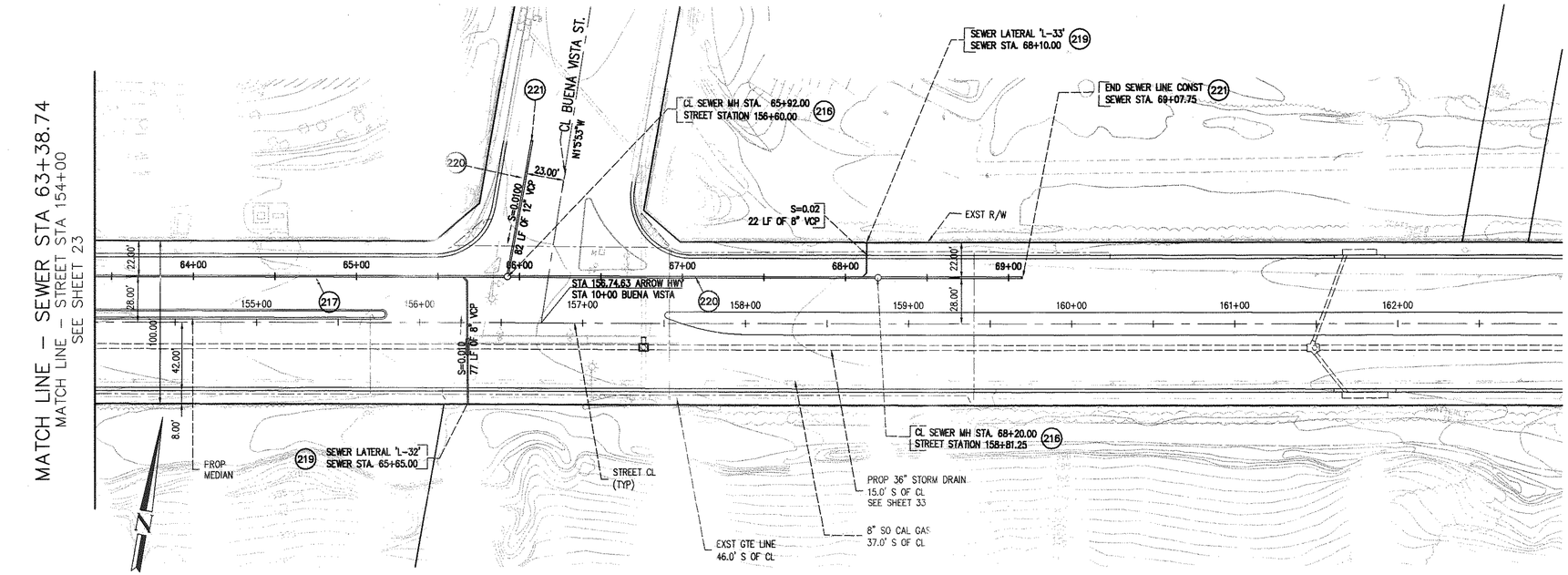




CONSTRUCTION NOTES:

(216) CONST SEWER MH PER STD 200-2
(217) CONST 15" VCP
(219) CONST 8" SEWER LATERAL PER STD 222-1
(220) CONST 12" VCP
(221) PLUG END WITH BRICK AND MORTAR

ARROW HWY

REVISIONS				BENCH MARK	
NO.	DATE	INIT.	APPVD	BENCH MARK NUMBER	BENCH
				FC BR CAP IN S END W MI	CF BRIDGE NO
				82 FT E APPROX C/L IN	-76 1995), NG

V. = 353.870
COR PECK RD & LIVE OAK ST 48 FT S &
UM

PREPARED UNDER THE SUPERVISION OF: 9/27/99
ENKI NARSIM RCE NO. 44870 EXP. 3-31-02
DRAWN BY JKC/HYO
CHECKED –
RECOMMENDED –
APPROVED 9/27/99
ROD POSADA, P.E.
PUBLIC WORKS DIRECTOR/CITY ENGINEER
DATE:

PLANS PREPARED BY:
Hall & Foreman, Inc.
Civil Engineering · Planning · Surveying · Public Works
833 N. Golden Circle Dr., Ste. 300 · Santa Ana, CA 92705-4010 · (714)664-0570

REGISTERED PROFESSIONAL ENGINEER ENKI NARASIMHAN No. 44870 Exp. 3/31/02 CIVIL STATE OF CALIFORNIA

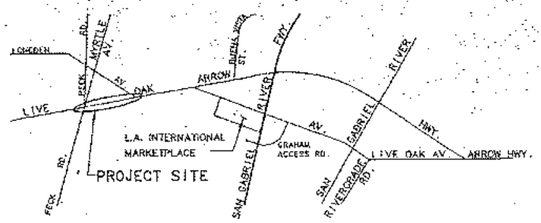
CITY IRWINDALE
SANITARY SEWER IMPROVEMENT PLAN & PROFILE
ARROW HIGHWAY & E. LIVE OAK AVENUE
STREET STA 154+00 TO 300' E/O BUENA VISTA ST
IRWINDALE CALIFORNIA

SHT 24 OF 73

R:\99167\SW\99167D3.dwg 9-28-99 11:24:31 am EST

CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA

SEWER IMPROVEMENTS
IN
LIVE OAK AVENUE
FROM STATION 0+91.50 TO STATION 22+47.07



VICINITY MAP
NTS

BENCHMARK ELEV.- 353.87
C.G. 2637 BASELINE (1975)
F.C. BRASS CAP 67-78, 1959 IN S END OF WING WALL OF BRIDGE 964 @ THE S/E COR. PECK RD. & LIVE OAK AVE. 48' S & 82' E OF APPROX CL

CONSTRUCTION NOTES:

(5) CONSTRUCT SHALLOW MANHOLE PER LACDPW STD. 2002-0.
(6) CONSTRUCT STD. 60"ø MANHOLE TYPE "E" PER C.S.D. STD. S-a-206.
(7) CONSTURCT 20" X 8" TEE & PLUG END.
(8) INSTALL 36" O.D. X 3/8" THICK STEEL PIPE CASING.
(11) CONSTRUCT 20"ø D.I.P. CLASS 50 OR CLASS 52 W/ TYTON JOINTS. ASTM A746.
(12) CONSTRUCT MANHOLE FRAME & COVER PER C.S.D. STD. S-a-228.
(13) CONSTRUCT MANHOLE FRAME & COVER PER LACDPW STD. 2014-0.
(15) CONSTRUCT MANHOLE STEPS PER C.S.D. STD. S-a-209.
(16) CONSTRUCT JUNCTION STRUCTURE "A" PER ARMY CORPS OF ENGINEERS PERMIT MANUAL FIGURE A-18.
(17) CONSTRUCT CONDUIT SUPPORT, CASE 2, PER APWA STD. PLAN 224-0.

LIST OF DRAWINGS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	PLAN & PROFILE
3	PLAN & PROFILE

GENERAL NOTES

1. ALL WORK SHALL BE PERFORMED IN STRICT CONFORMANCE WITH THE CURRENT STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1992 EDITION AND ALL SUPPLEMENTS APPURTENANT THERETO AND LACDPW STANDARD DRAWINGS LATEST EDITION.
2. ANY CONTRACTOR PERFORMING WORK ON THIS PROJECT SHALL FAMILIARIZE HIMSELF WITH THE SITE AND SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM HIS OPERATIONS, WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
3. ALL OBSTRUCTIONS WITHIN THE AREA TO BE IMPROVED ARE TO BE REMOVED AND/OR RELOCATED AT THE DIRECTION OF THE CITY ENGINEER. UTILITIES SHALL BE RELOCATED BY THEIR RESPECTIVE OWNERS. THE CONTRACTOR IS REFERRED TO SECTION 5 OF THE STANDARD SPECIFICATIONS.
4. UTILITY LINE LOCATIONS WERE TAKEN FROM RECORD AND WERE NOT LOCATED IN THE FIELD, UNLESS OTHERWISE NOTED ON THE PLAN. THE CONTRACTOR IS REFERRED TO SECTION 5 OF THE STANDARD SPECIFICATIONS.
5. ALL WORK SHALL CONFORM TO THE PROVISIONS OF CONSTRUCTION SAFETY ORDERS ISSUED BY THE STATE DIVISION OF INDUSTRIAL SAFETY. IN CASE OF ANY ACCIDENTS INVOLVING SAFETY MATTERS COVERED BY SECTION 842+ OF THE CALIFORNIA LABOR CODE, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE STATE DIVISION OF INDUSTRIAL SAFETY.
6. CALL UNDERGROUND SERVICE ALERT FOR UNDERGROUND LOCATIONS 48 HOURS BEFORE YOU DIG AND PAVE AT (800) 422-4133.
7. THE CONTRACTOR SHALL OBTAIN A NO-FEE TRAFFIC CONTROL PERMIT 48 HOURS PRIOR TO TIME OF CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR IS REFERRED TO SECTION 7-10.3 OF THE STANDARD SPECIFICATIONS.
8. THE CONTRACTOR SHALL RENEW OR REPLACE ANY EXISTING TRAFFIC STRIPING AND/OR PAVEMENT MARKINGS WHICH HAVE BEEN EITHER REMOVED OR THE EFFECTIVENESS OF WHICH HAS BEEN REDUCED AS A RESULT OF HIS OPERATIONS. RENEWAL OF PAVEMENT STRIPING AND MARKINGS SHALL BE DONE IN CONFORMANCE WITH SECTION 310-5.6 OF THE STANDARD SPECIFICATIONS.
9. ALL SEWER MAINS SHALL BE EXTRA STRENGTH VITRIFIED CLAY PIPE (V.C.P.) UNLESS OTHERWISE SHOWN AND APPROVED BY THE CITY ENGINEER.
10. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF EXISTING SEWER MAIN(S) AND NOTIFY THE DESIGN ENGINEER OF ANY VARIATION FROM DESIGN.
11. ALL MANHOLES ARE CONSIDERED A CONFINED SPACE WHERE TOXIC FUMES MAY COLLECT. THE CONTRACTOR SHALL FOLLOW ALL CAL-OSHA REGULATIONS WHILE WORKING IN SUCH CONFINED SPACES INCLUDING THE USE OF BREATHING APPARATUS WHERE FOUND NECESSARY.
12. CONSTRUCTION OF NEW SEWER MAIN SHALL BE DONE IN ACCORDANCE WITH STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES CRITERIA FOR SEPARATION OF WATER MAINS AND SANITARY SEWERS. THE PLANS INDICATE THE CASE AND ZONE UNDER THESE GUIDELINES DETERMINED BY A SEARCH OF AVAILABLE UTILITY RECORDS. SHOULD THE CONTRACTOR ENCOUNTER CONDITIONS WHICH REQUIRE A MODIFICATION OF THE STATED CASE AND ZONE IN THE FIELD, HE SHALL IMMEDIATELY BRING IT TO THE ATTENTION OF THE CITY ENGINEER.
13. LEAKAGE TESTS SHALL BE PERFROMED ON ALL SEWERS AS SPECIFIED IN S.S.P.W.C. SECTION 306-1.4.4
14. TRAFFIC CONTROL WILL BE PROVIDED IN ACCORDANCE WITH THE SPECIAL PROVISIONS OF THE CITY OF IRWINDALE.
15. NO CONNECTION FOR THE DISPOSAL OF INDUSTRIAL WASTES SHALL BE MADE TO SEWERS SHOWN ON THESE DRAWINGS UNTIL A PERMIT FOR INDUSTRIAL WASTEWATER DISCHARGE HAS BEEN ISSUED BY THE SANITATION DISTRICTS FOR SAID CONNECTION.

PRINTED
JUN 23 1998
CIVILTEC ENGINEERING

REVISIONS			
NO.	DESCRIPTION	APP.	DATE

REGISTERED PROFESSIONAL ENGINEER BARBARA L. HALL No. 42206 EXP. 03/31/99 CIVIL STATE OF CALIFORNIA

APPROVED — CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO — CITY ENGINEER
10857 RCE DATE

SUBMITTED:
BY THE CONSULTANT 42206 RCE 6-22-98 DATE

CIVILTEC engineering inc.
(818) 967-0588

CITY OF IRWINDALE

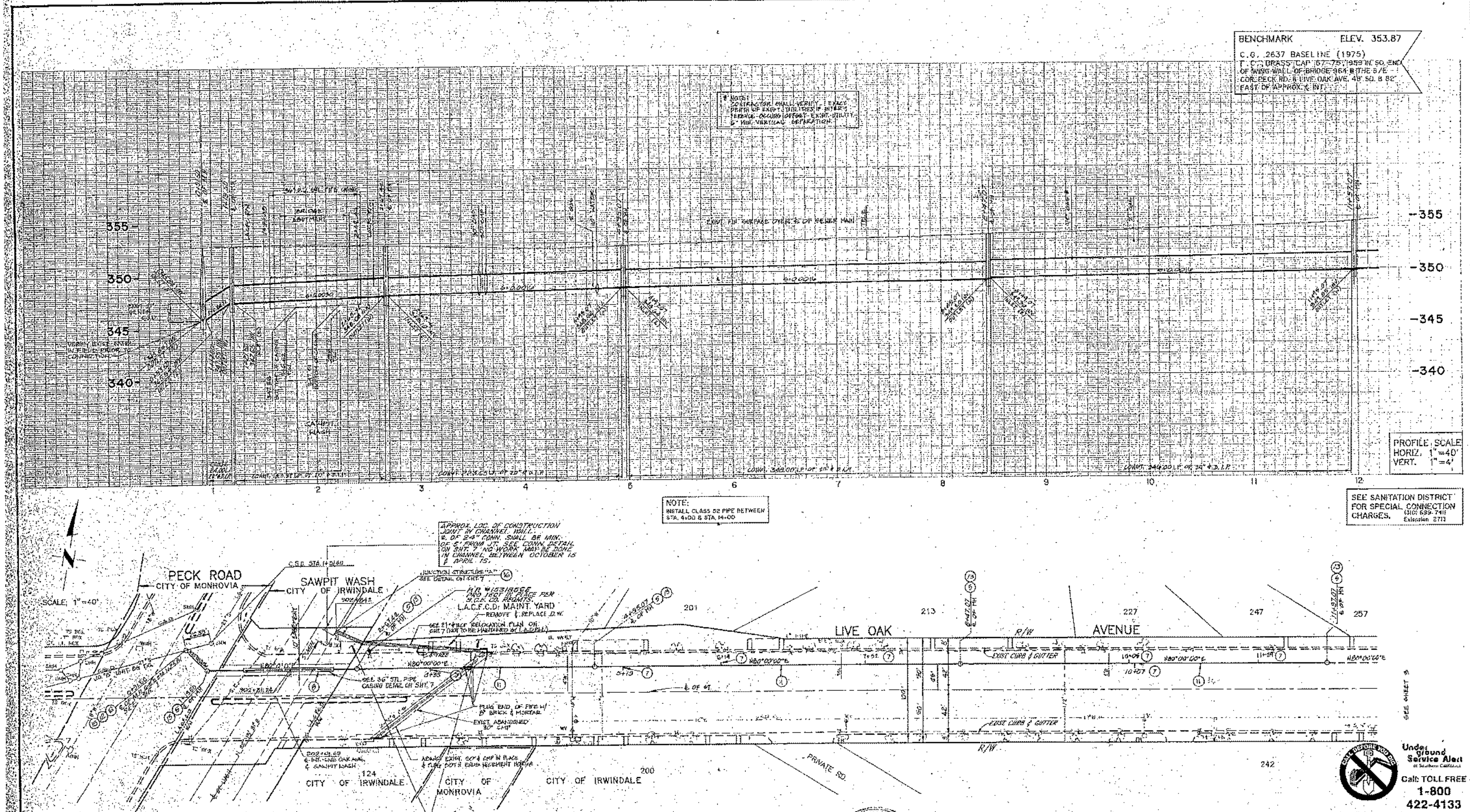
LIVE OAK AVE. SANITARY SEWER

TITLE SHEET

DESIGN: BLH	CHECKED: BLH	SCALE: NONE
DRAWN: HC	J.N. 92-206	SHEET 1 OF 3

LIVE OAK SEWER (L.A. INTER.)

1 of 7



THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS; HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

CITY ENGINEER ________ DATE ________

Underground Service Alert of Southern California
Call: TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

NOTE:
THE EXISTENCE & LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS DRAWING. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN & ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

PRINTED
JUN 2 3 1993
CIVILTEC ENGINEERING

APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO - CITY ENGINEER

REGISTERED PROFESSIONAL ENGINEER
BARBARA L. HALL
No. 42206
CIVIL
STATE OF CALIFORNIA

REV.	DATE	BY	DESCRIPTION

SUBMITTED: Barbara L. Hall — 42206 R.C.E. — 6-22-93 DATE
FOR THE CONSULTANT
APPROVED: ________ DATE

DESIGNED: R.S.
DRAWN: R.S.
CHECKED:

SCALE: AS SHOWN

CIVILTEC engineering inc.
(818) 357-0666

CITY OF IRWINDALE

LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS

FROM STA. 0+91.50 TO STA. 11+97.07

SHEET 2 OF 3 SHEETS

BENCHMARK ELEV. 353.87

C.G. 2837 BASELINE (1975)
I.C. BRASS CAP 62+78.1959 IN SO. END
OF WING WALL OF BRIDGE 964 @ THE S/E
COR. BECK RD. & LIVE OAK AVE, 46' SO. & 82'
EAST OF APPROX. ℄ INT.

* NOTE:
CONTRACTOR SHALL VERIFY EXIST. DEPTH OF EXIST. UTILITY IN INTERFERENCE / CROSSING OFFSET EXIST. UTILITY 6" MIN. VERTICAL SEPARATION.

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

NOTE:
INSTALL CLASS 52 PIPE BETWEEN STA. 4+00 & STA. 15+00

SEE SANITATION DISTRICT FOR SPECIAL CONNECTION CHARGES, (562) 699-7411 Extension 2715

SCALE: 1"=40'

LONGDEN AVENUE

LIVE OAK

VACANT LOT

AVENUE

PRINTED
JUN 23 1993
CIVILTEC ENGINEERING

APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO - CITY ENGINEER
BY: _____ C19857 DATE: _____
R.C.E.

THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS. HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

CITY ENGINEER DATE

REV.	DATE	BY	DESCRIPTION

SUBMITTED:
FOR THE CONSULTANT
APPROVED:
42206 R.C.E. 6-22-93 DATE
DATE

DESIGNED: R.S.
DRAWN: R.S.
CHECKED:

SCALE: AS SHOWN

CIVILTEC engineering inc.
(818) 357-0538

Underground Service Alert of Southern California
Call: TOLL FREE 1-800 422-4133
TWO WORKING DAYS BEFORE YOU DIG

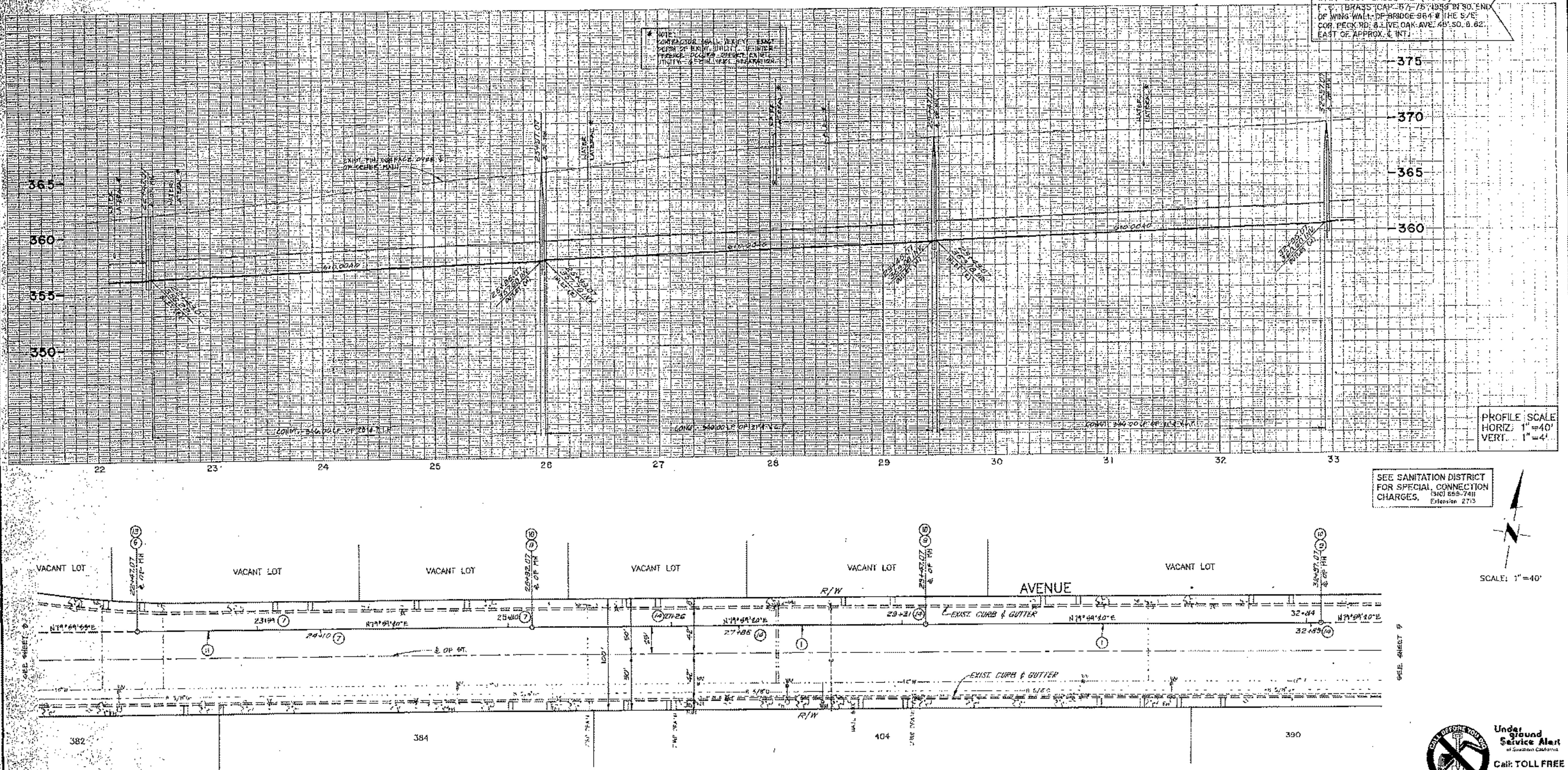
NOTE:
THE EXISTENCE & LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS DRAWING. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN & ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

CITY OF IRWINDALE
LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS
FROM STA. 11+97.07 TO STA. 22+47.07

SHEET 3 OF 5 SHEETS

Std. 6.02 2/82

3 of 7



BENCHMARK ELEV. 353.87

C.G. 2637 BASELINE (1975)
F.C. BRASS CAP 67-75 1959 IN SO. END OF WING WALL OF BRIDGE 964 @ THE S/E COR. PECK RD. & LIVE OAK AVE. 48' SO. & 82' EAST OF APPROX. ℄ INT.

PROFILE SCALE
HORIZ. 1" = 40'
VERT. 1" = 4'

SEE SANITATION DISTRICT FOR SPECIAL CONNECTION CHARGES. (310) 699-7411 Extension 2713

SCALE: 1" = 40'

Underground Service Alert of Southern California
Call: TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

NOTE:
THE EXISTENCE & LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS DRAWING. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN & ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS. HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

CITY ENGINEER ______ DATE ______

REGISTERED PROFESSIONAL ENGINEER KENNETH I. MULLEN No. 9692 Exp. 12/31/92 CIVIL STATE OF CALIFORNIA

APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO - CITY ENGINEER
BY ______ C19887 R.C.E. DATE ______

REV.	DATE	BY	DESCRIPTION

SUBMITTED: Kenneth I. Mullen 9692 R.C.E. 9/3/92 DATE
FOR THE CONSULTANT
APPROVED: ______ DATE

DESIGNED: R.S.
DRAWN: R.S.
CHECKED: K.I.M.

SCALE: AS SHOWN

KENNETH I. MULLEN, CONSULTING ENGINEERS, INC.
KIM
ARCADIA
(818) 445-2212

CITY OF IRWINDALE
LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS
FROM STA. 22+47.07 TO STA. 32+97.07

SHEET 4 OF 7 SHEETS

NOV 9 199_

Std.6.02. 2/82

BENCHMARK ELEV. 353.87

C.C. 2637 BASELINE (1975)
5" C.I. BRASS CAP 67' 76, 1989'N 50' END OF WING WALL OF BRIDGE 964 @ THE S/E COR. PECK RD. & LIVE OAK AVE. 48' 50' & 82' EAST OF APPROX. ℄ INT.

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

SEE SANITATION DISTRICT FOR SPECIAL CONNECTION CHARGES. (310) 699-7411 Extension 2763

SCALE: 1"=40'

VACANT LOT

LIVE OAK AVENUE

R/W

EXIST. CURB & GUTTER

VACANT LOT

ARROW HIGHWAY

EXIST. CURB & GUTTER

OLD ℄ OF ST.

LIVE OAK AVENUE

SEE SHEET 6

Underground Service Alert of Southern California
Call: TOLL FREE 1-800 422-4133
TWO WORKING DAYS BEFORE YOU DIG

NOTE:
THE EXISTENCE & LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS DRAWING. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN & ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO - CITY ENGINEER
BY: _____ R.C.E. 19887 DATE: _____

THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS. HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

CITY ENGINEER _____ DATE _____

REGISTERED PROFESSIONAL ENGINEER KENNETH I. MULLEN No. 9692 Exp. 12/31/92 CIVIL STATE OF CALIFORNIA

REV.	DATE	BY	DESCRIPTION

SUBMITTED: _____ 9692 R.C.E. 9/16/92 DATE
FOR THE CONSULTANT
APPROVED: _____ DATE

DESIGNED: K.S.
DRAWN: R.S.
CHECKED: K.I.M.

SCALE: AS SHOWN

KENNETH I. MULLEN, CONSULTING ENGINEERS, INC.
ARCADIA
(818) 445-2212

CITY OF IRWINDALE
LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS
FROM STA. 32+97.07 TO STA. 42+32.52

SHEET 5 OF 7 SHEETS

BENCHMARK ELEV. 353.87

C.G. 2637 BASELINE (1975)
F.C. BRASS CAP 67-76,3959 IN SO. END OF WING WALL OF BRIDGE 964 @ THE S/E COR. PECK RD. & LIVE OAK AVE. 48' SO. & 82' EAST OF APPROX. ℄ INT.

Underground Service Alert of Southern California
Call: TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

NOTE:
THE EXISTENCE & LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS DRAWING. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN & ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS. HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

CITY ENGINEER DATE

KENNETH I. MULLEN No. 9692 Exp. 12/31/92 CIVIL

APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO - CITY ENGINEER

BY: CITY R.C.E. DATE:

REV.	DATE	BY	DESCRIPTION

SUBMITTED:
Kenneth I. Mullen 9692 9/30/90
FOR THE CONSULTANT R.C.E. DATE
APPROVED:
DATE

DESIGNED: R.S.
DRAWN: R.S.
CHECKED: K.I.M.

SCALE: AS SHOWN

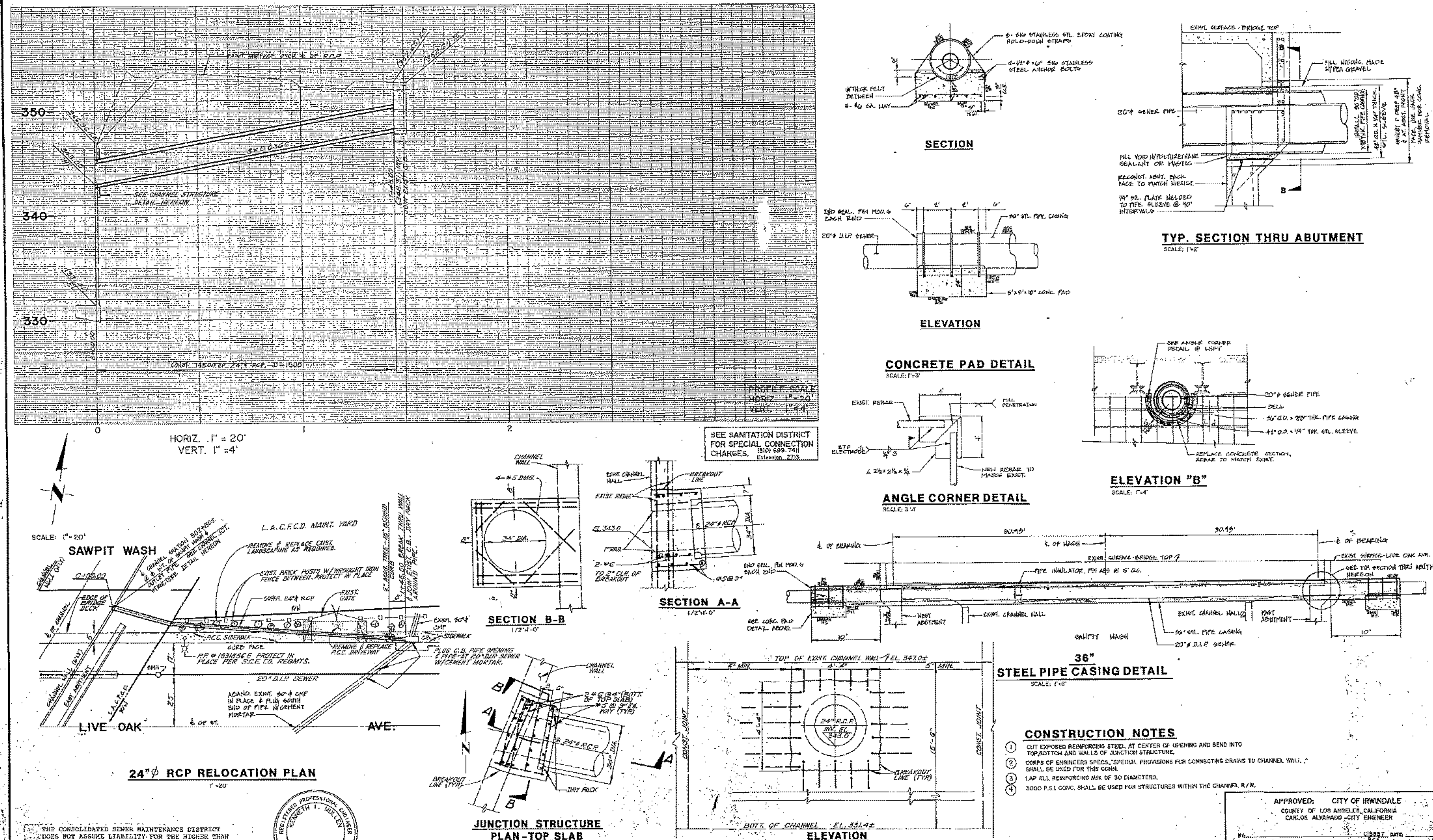
KENNETH I. MULLEN, CONSULTING ENGINEERS, INC.
KIM
ARCADIA
(818) 445-2212

CITY OF IRWINDALE
LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS
FROM STA. 42+32.52 TO STA. 51+59.50.

SHEET 6 OF 7 SHEETS

NOV 9 2002

SM 6.02 - 2/62



CONSTRUCTION NOTES

1. CUT EXPOSED REINFORCING STEEL AT CENTER OF OPENING AND BEND INTO TOP, BOTTOM AND WALLS OF JUNCTION STRUCTURE.
2. CORPS OF ENGINEERS SPECS. "SPECIAL PROVISIONS FOR CONNECTING DRAINS TO CHANNEL WALL." SHALL BE USED FOR THIS CONN.
3. LAP ALL REINFORCING MIN. OF 30 DIAMETERS.
4. 3000 P.S.I. CONC. SHALL BE USED FOR STRUCTURES WITHIN THE CHANNEL R/W.

THE CONSOLIDATED SEWER MAINTENANCE DISTRICT DOES NOT ASSUME LIABILITY FOR THE HIGHER THAN NORMAL MAINTENANCE OF THIS SANITARY SEWER SYSTEM BECAUSE IT DOES NOT MEET THE MINIMUM DESIGN REQUIREMENTS. HOWEVER, NORMAL ROUTINE MAINTENANCE INSPECTIONS WILL BE PERFORMED BY THE DISTRICT.

CITY ENGINEER ______ DATE ______

REGISTERED PROFESSIONAL ENGINEER — KENNETH I. MULLEN — No. 9692 — Exp. 12/31/92 — CIVIL — STATE OF CALIFORNIA

APPROVED: CITY OF IRWINDALE
COUNTY OF LOS ANGELES, CALIFORNIA
CARLOS ALVARADO - CITY ENGINEER
BY ______ C19857 R.C.E. DATE ______

REV.	DATE	BY	DESCRIPTION

SUBMITTED: [signature] 9692 R.C.E. 7/24/92 DATE
FOR THE CONSULTANT
APPROVED: ______ DATE

DESIGNED: R.S./B.H.
DRAWN: R.S.
CHECKED: K.I.M.

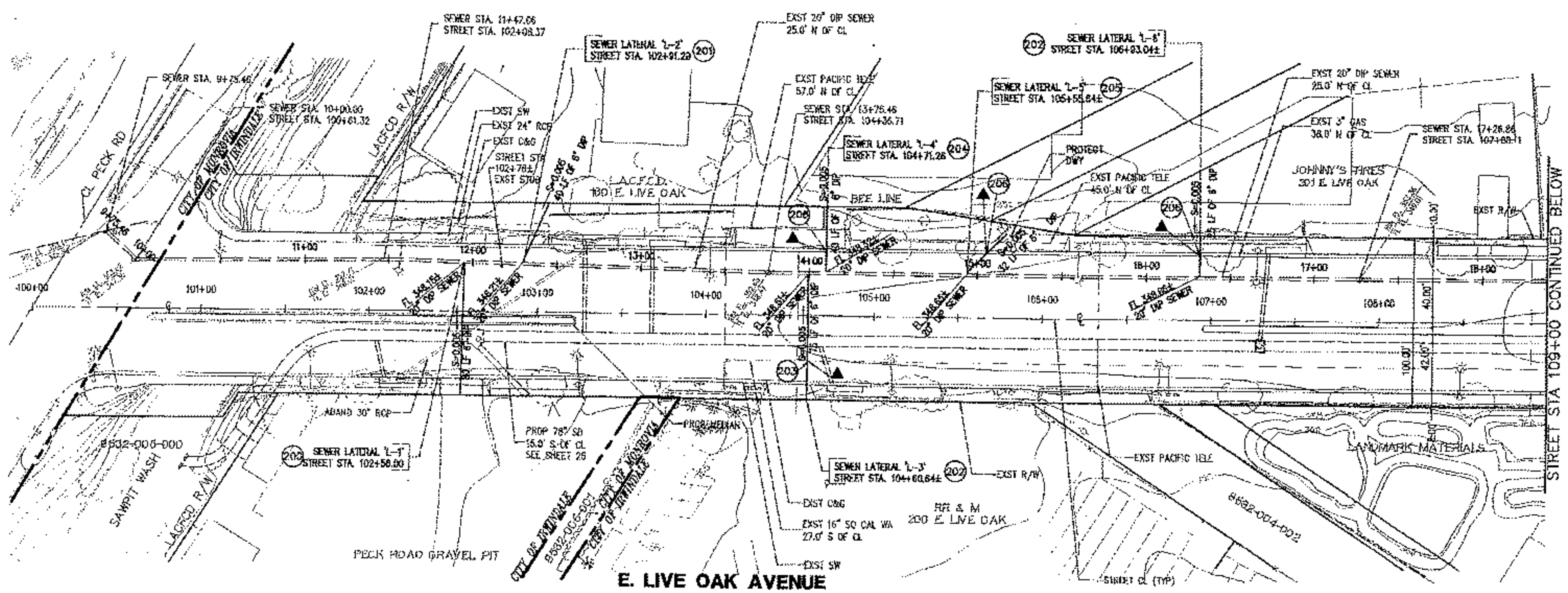
SCALE: AS SHOWN

KENNETH I. MULLEN, CONSULTING ENGINEERS, INC.
KIM
ARCADIA
(818) 445-2212

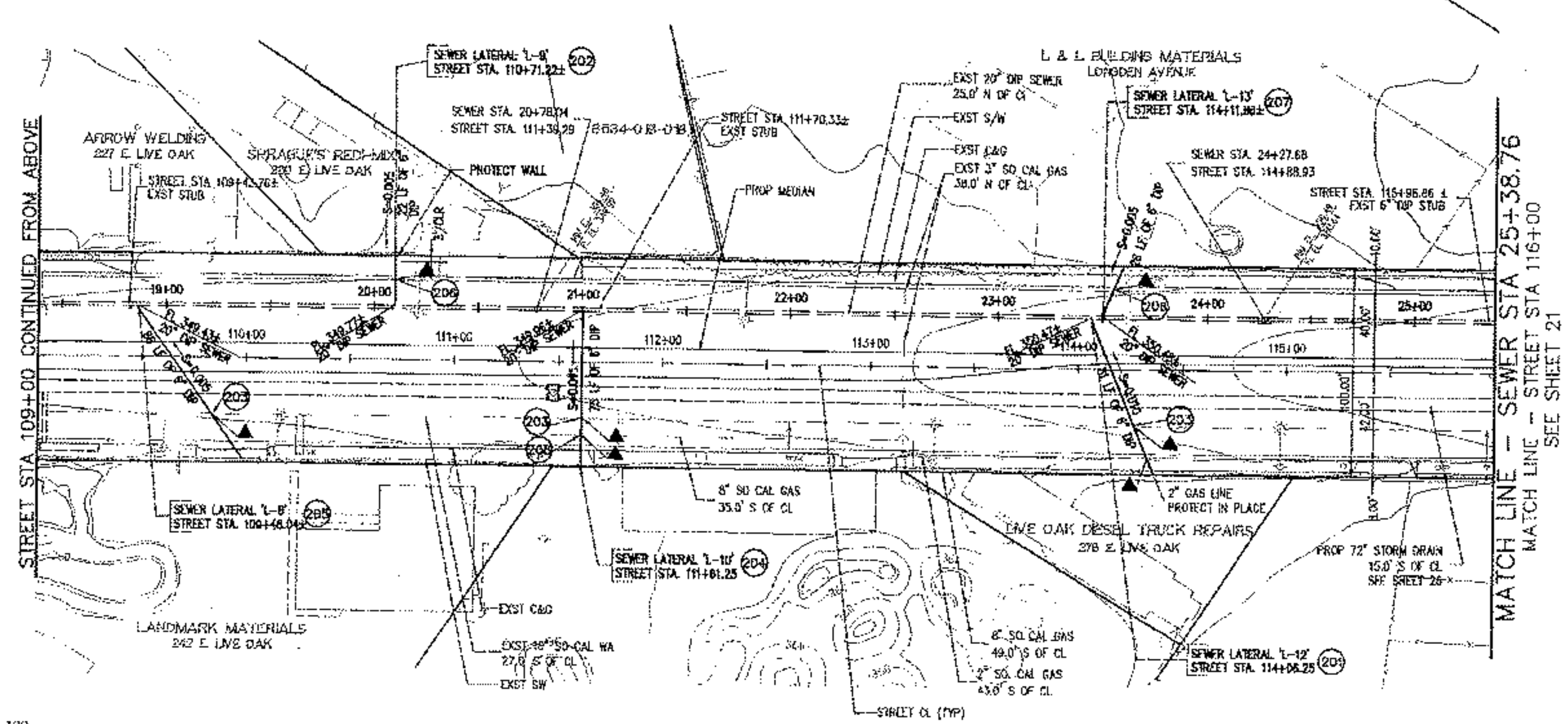
CITY OF IRWINDALE
LIVE OAK AVE. SANITARY SEWER IMPROVEMENTS
SECTIONS & DETAILS

SHEET 7 OF 7 SHEETS

Std. 5.02 2/82



E. LIVE OAK AVENUE



E. LIVE OAK AVENUE

CONSTRUCTION NOTES:

- (200) INSTALL 20"X8" TAPPING SADDLE M.J. 8" DIP & PLUG END
- (201) INSTALL 20"X6" TAPPING SADDLE M.J. & 6" 22-1/2" BEND, 6" DIP & PLUG END
- (202) REMOVE EXST 6" PLUG & INSTALL 6" DIP
- (203) REMOVE INTERFERING PORTIONS OF EXST 16" WATER MAIN & INSTALL NEW 16" DIP WATER MAIN AS REQUIRED, BY OTHERS (NIC)
- (204) INSTALL 20"X6" TAPPING SADDLE M.J. 8" DIP & PLUG END
- (205) REMOVE EXST PLUG & INSTALL 6" 45° BEND 6" DIP & PLUG END
- (206) RELOCATE EXST 3" GAS LINE AS REQUIRED, BY OTHERS (NIC)
- (207) REMOVE EXST PLUG, INSTALL 6" 22-1/2" BEND, 6" DIP & PLUG END
- (208) RELOCATE EXST 8" GAS LINE AS REQUIRED, BY OTHERS (NIC)

REVISIONS				
NO.	DATE	INIT.		APPVD

BENCHMARK

BENCH MARK NUMBER: CG 2637 BENCH MARK ELEV. = 353.870
FC BR CAP IN S END W WINGWALL OF BRIDGE NO 984 @ SE COR PECK RD & LIVE OAK ST 40 FT S & 52 FT E APPROX C/L INT MKD (67-76 1995) NGVD 29 DATUM

PREPARED UNDER THE SUPERVISION OF: 9/27/99
VENKI HARSH RCE NO. 44670 EXP. 3-31-02
DRAWN BY: JKC/BPD
CHECKED: –
RECOMMENDED:
APPROVED: 9/27/99
BOD POSADA, P.E.
PUBLIC WORKS DIRECTOR/CITY ENGINEER
DATE

PLANS PREPARED BY:
Hall & Foreman, Inc.
Civil Engineering - Planning - Surveying - Public Works
203 N. Golden Circle Dr., Ste. 300 - Santa Ana, CA 92705-4010 - (714)665-4570

REGISTERED PROFESSIONAL ENGINEER No. 44670 Exp. 3/31/02 CIVIL STATE OF CALIFORNIA

CITY OF IRWINDALE

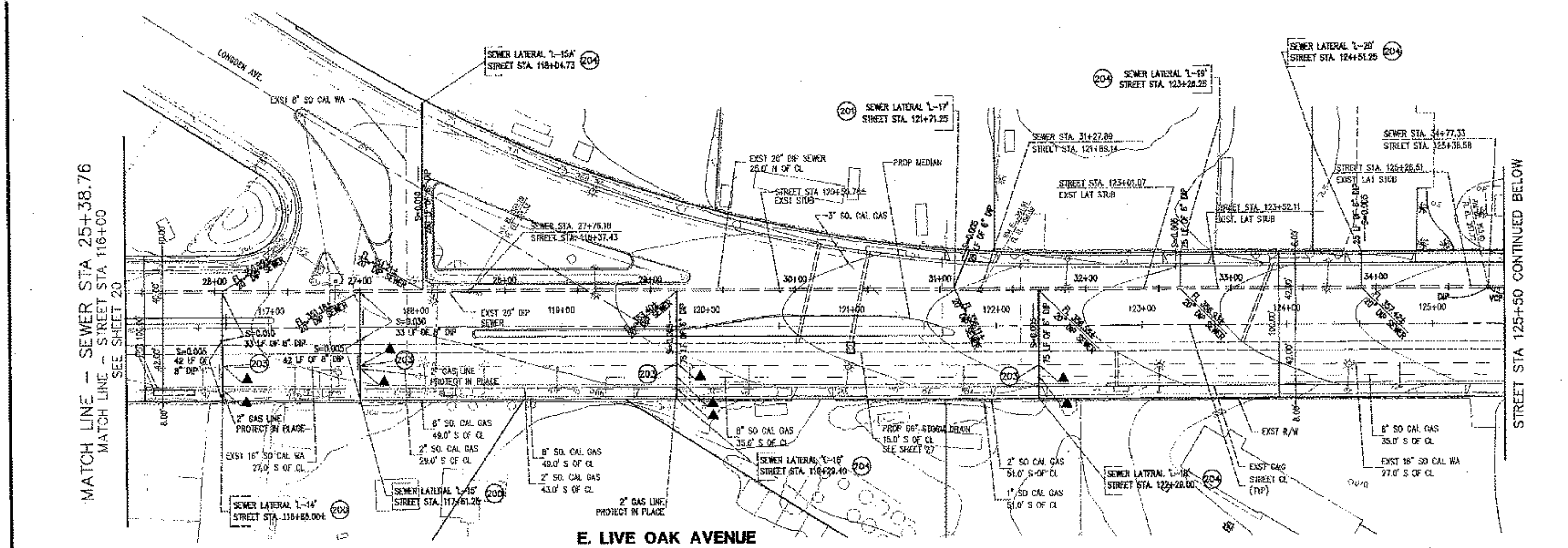
SANITARY SEWER LATERALS

ARROW HIGHWAY & E. LIVE OAK AVENUE

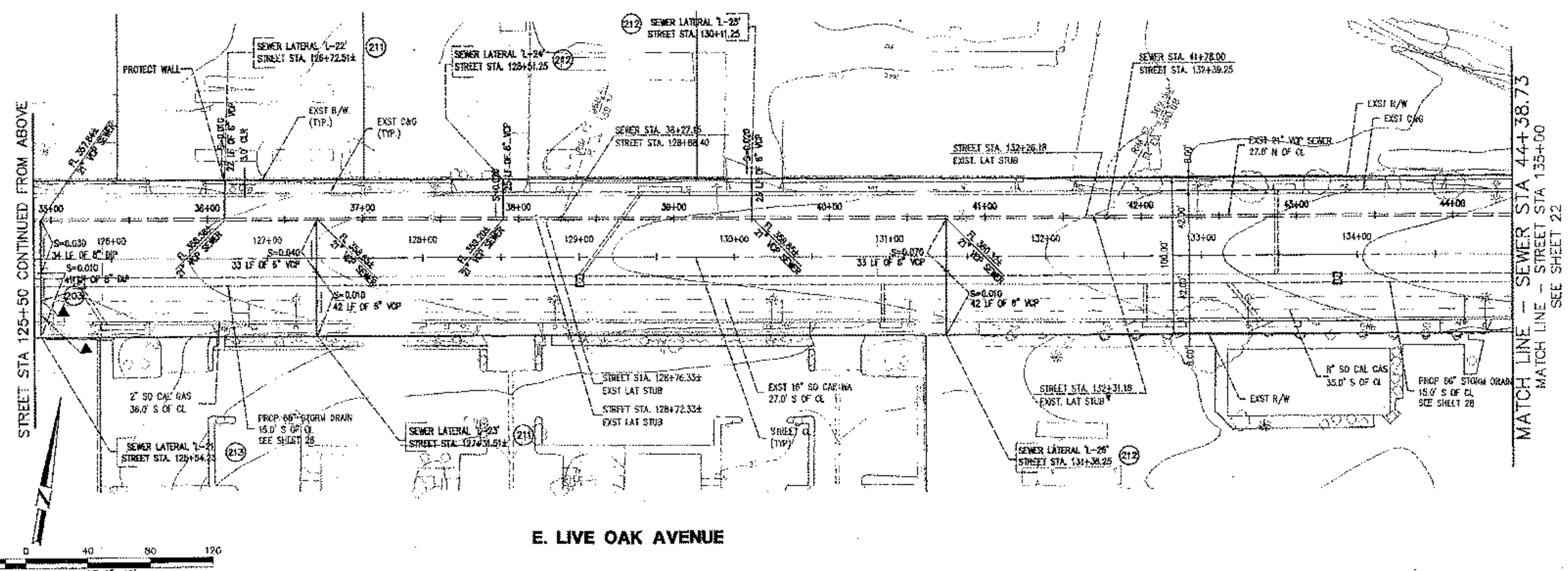
STREET STA 100+00 TO 116+00

IRWINDALE CALIFORNIA

SHT 20 OF 73



E. LIVE OAK AVENUE



E. LIVE OAK AVENUE

CONSTRUCTION NOTES:

- (200) INSTALL 20"X6" TAPPING SADDLE MJ, 6" DIP & PLUG END
- (201) INSTALL 20"X6" TAPPING SADDLE MJ, & 6" 22-1/2" BEND, 6" DIP & PLUG END
- (203) REMOVE INTERFERING PORTIONS OF EXST 16" WATER MAIN & INSTALL NEW 16" DIP WATER MAIN AS REQUIRED, BY OTHERS (NIC)
- (204) INSTALL 20"X6" TAPPING SADDLE MJ, 6" DIP & PLUG END
- (208) RELOCATE EXST 8" GAS LINE AS REQUIRED, BY OTHERS (NIC)
- (211) REMOVE EXST CAP & INSTALL 6" VCP LATERAL PER STD 222-1
- (212) INSTALL SADDLE PER LACDPW STD 2025-1 & 6" VCP LATERAL PER STD 222-1
- (213) INSTALL SADDLE PER LACDPW STD 2025-1 & 8" VCP LATERAL PER STD 222-1

REVISIONS				
NO.	DATE	INIT.		APPVD

BENCHMARK

BENCH MARK NUMBER: CG 2637 BENCH MARK ELEV. = 353.870
PC RR CAP IN S END W WINGWALL OF BRIDGE NO 964 @ SE COR PECK RD & LIVE OAK ST 48 FT S & 82 FT E APPROX C/L INT MKD (67-76 1985). NGVD 29 DATUM

PREPARED UNDER THE SUPERVISION OF: VENKI HAMSIM RCE NO. 44870 EXP. 3-31-02 DATE
DRAWN BY
CHECKED
RECOMMENDED
APPROVED ROD POSADA, P.E. PUBLIC WORKS DIRECTOR/CITY ENGINEER DATE:

PLANS PREPARED BY:
Hall & Foreman, Inc.
Civil Engineering • Planning • Surveying • Public Works
203 N. Golden Circle Dr., Ste. 300 • Santa Ana, CA 92705-4010 • (714) 664-0570

REGISTERED PROFESSIONAL ENGINEER No. 44870 Exp. 3/31/02 CIVIL STATE OF CALIFORNIA

CITY OF IRWINDALE

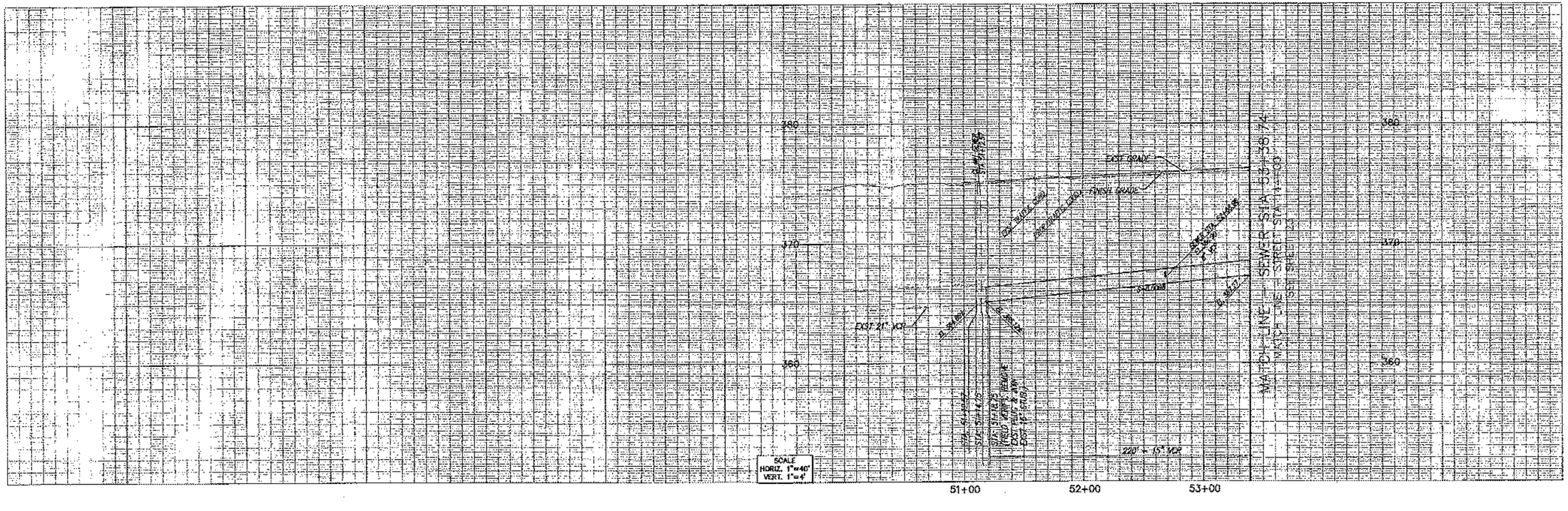
SANITARY SEWER LATERALS

ARROW HIGHWAY & E. LIVE OAK AVENUE

STREET STA 16+00 TO 135+00

IRWINDALE CALIFORNIA

SHT 21 OF 73



CONSTRUCTION NOTES:

- ⑵13 INSTALL SADDLE PER LACDPW STD 2025-1 & 8" VCP LATERAL PER STD 222-1
- 217 CONST 15" VCP
- 218 CONST 6" SEWER LATERAL PER STD 222-1
- 224 REMOVE EXST CAP & INSTALL 6"-1/16 BEND & 6" VCP LATERAL PER STD 222-1

REVISIONS

NO.	DATE	INIT.		APP'D

BENCHMARK

BENCH MARK NUMBER: CG 2637 BENCH MARK ELEV. = 353.870

FC BR CAP IN S END W WINGWALL OF BRIDGE NO 964 @ SE COR PECK RD & LIVE OAK ST 48 FT S & 82 FT E APPROX C/L (NT MKD (67-75 1985), NGVD 29 DATUM

PREPARED UNDER THE SUPERVISION OF: Mukah 9/27/99
VENKI NAPSRI RCE NO. 44870 EXP. 3-31-02
DRAWN BY JKC/BYO
CHECKED -
RECOMMENDED -
APPROVED Rod Posada 9/27/99
ROD POSADA, P.E.
PUBLIC WORKS DIRECTOR/CITY ENGINEER
DATE
DATE:

PLANS PREPARED BY:

Hall & Foreman, Inc.
Civil Engineering - Planning - Surveying - Public Works
203 N. Golden Circle Dr., Ste. 300 - Santa Ana, CA 92705-4010 - (714)665-4500

No. 44870
Exp. 3/31/02

CITY OF IRWINDALE

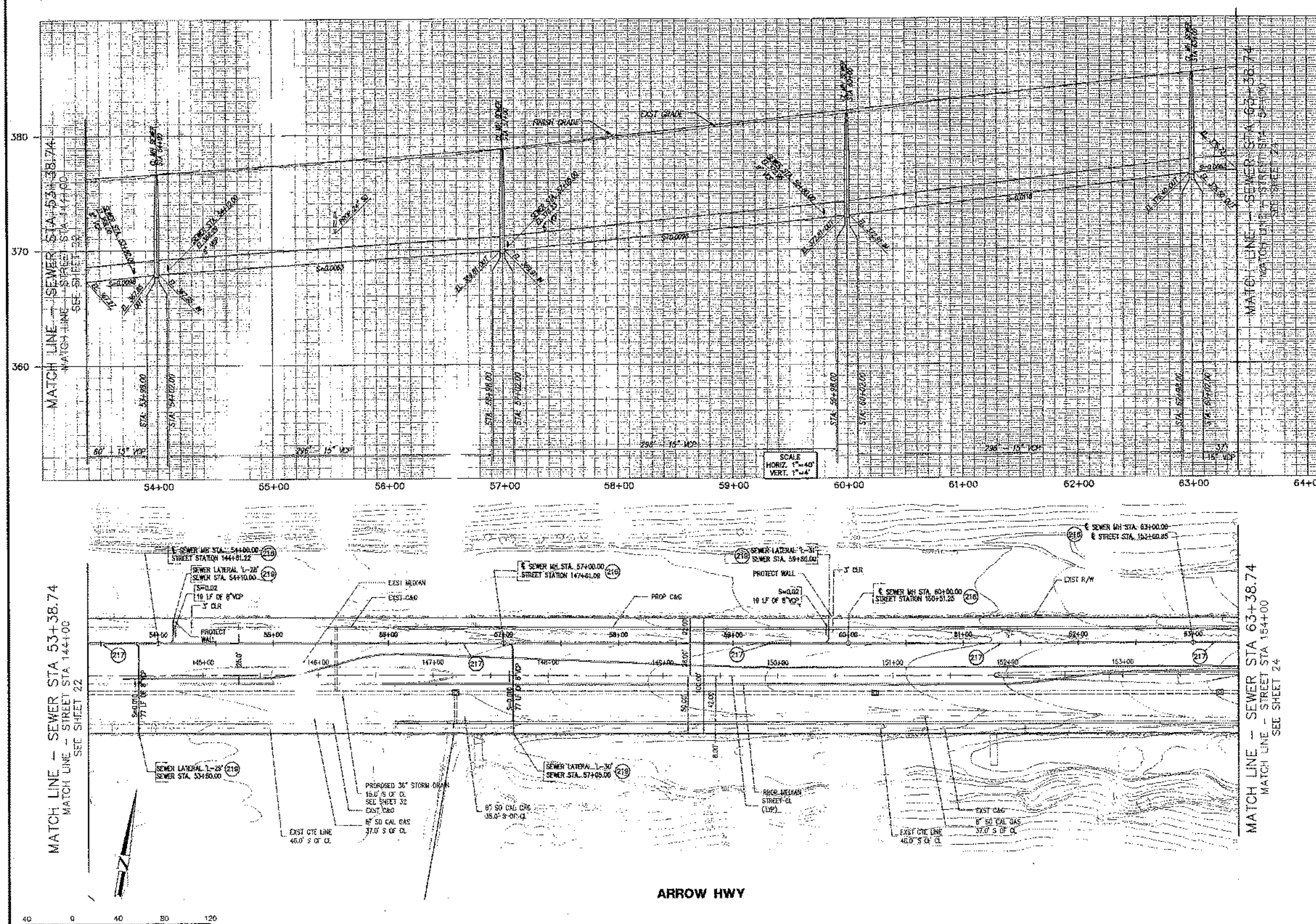
SANITARY SEWER IMPROVEMENT PLAN & PROFILE

ARROW HIGHWAY & E. LIVE OAK AVENUE

STREET STA 135+00 TO 144+00

IRWINDALE CALIFORNIA

SHT 22 OF 73



CONSTRUCTION NOTES:

- (216) — CONST SEWER MH PER STD 200-2
- (217) — CONST 15" VCP
- (219) — CONST 8" SEWER LATERAL PER STD 222-1

REVISIONS

NO.	DATE	INT.		APPV'D

BENCHMARK

BENCH MARK NUMBER: CR 2637 ... = 353.870
FC BR CAP IN S END W WINGWALL OF BRIDGE ... OR PECK RD & LIVE OAK ST 48 FT S & 82 FT E APPROX C/L INT MKD (67-76 1995). ...

PREPARED UNDER THE SUPERVISION OF: 9/27/99
VERN MARSH RCE NO. 44870 EXP. 3-31-02
DRAWN BY: JKC/RYO
CHECKED
RECOMMENDED
APPROVED 9/27/99
ROD POSADA, P.E.
PUBLIC WORKS DIRECTOR/CITY ENGINEER
DATE

PLANS PREPARED BY:
Hall & Foreman, Inc.
Civil Engineering - Planning - Surveying - Public Works
203 N. Golden Circle Dr., Ste. 300 - Santa Ana, CA 92705-4060 - (714)665-4500

REGISTERED PROFESSIONAL ENGINEER No. 44870 Exp. 3/31/02 CIVIL STATE OF CALIFORNIA

CITY OF IRWINDALE

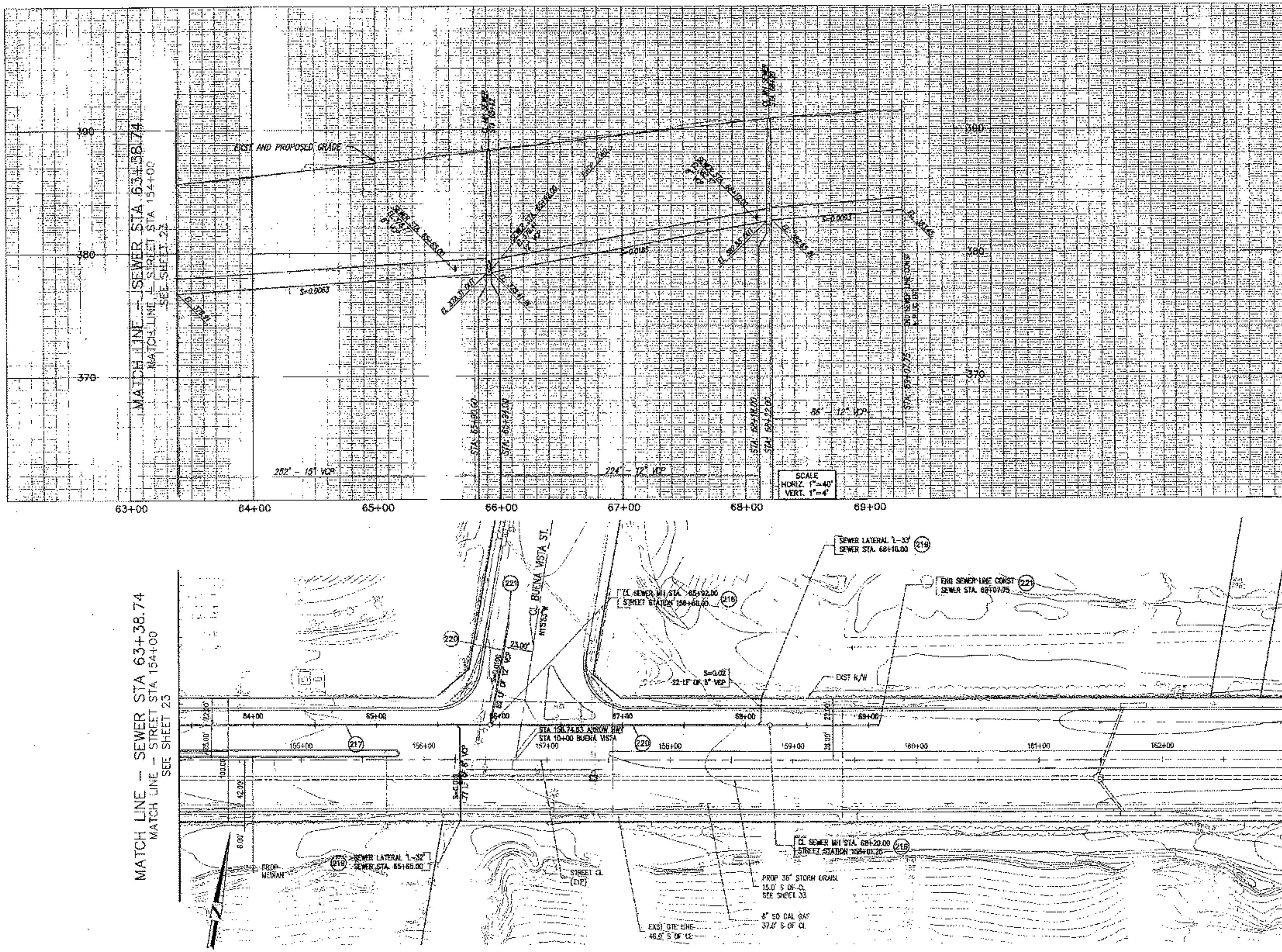
SANITARY SEWER IMPROVEMENT PLAN & PROFILE

ARROW HIGHWAY & E. LIVE OAK AVENUE

STREET STA 144+00 TO 154+00

IRWINDALE CALIFORNIA

23 OF 73



CONSTRUCTION NOTES:

- (216) CONST SEWER MH PER STD 203-2
- (217) CONST 15" VCP
- (219) CONST 6" SEWER LATERAL PER STD 222-1
- (220) CONST 12" VCP
- (221) PLUG END WITH BRICK AND MORTAR

REVISIONS					BENCH MARK	PREPARED UNDER THE SUPERVISION OF:	DATE	PLANS PREPARED BY:	CITY OF IRWINDALE
NO.	DATE	INIT.		APPVD	BENCH MARK NUMBER: ... ELEV. = 353.870	RCE NO. 44870 EXP. 3-31-02		Hall & Foreman, Inc.	SANITARY SEWER IMPROVEMENT PLAN & PROFILE
					FD BR CAP IN S END A ... 13' BRIDGE NO ... 76 1995), NE COR PECK RD & LIVE OAK ST 40 FT S & 82 FT E APPROX C/L INT ...	DRAWN BY JKC/KRO		Civil Engineering · Planning · Surveying · Public Works	ARROW HIGHWAY & E. LIVE OAK AVENUE
						APPROVED ... 9/27/99 ROD POSADA, P.E. PUBLIC WORKS DIRECTOR/CITY ENGINEER	DATE		STREET STA 154+00 TO 300' E/O BUENA VISTA ST
									IRWINDALE CALIFORNIA SHT 24 OF 73