



PRELIMINARY HYDROLOGY REPORT
RELATED BRISTOL SPECIFIC PLAN
SANTA ANA, CA

622.015.02



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RELATED BRISTOL SPECIFIC PLAN

SANTA ANA, CALIFORNIA

*PREPARED FOR
RCR Bristol, LLC
18201 Von Karman Avenue, Suite 900
Irvine, CA, 92612
949.660.7272*

*FUSCOE ENGINEERING, INC.
16795 Von Karman, Avenue, Suite 100
Irvine, California 92606
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*PROJECT MANAGER
Oriana Slasor, P.E.*

*DATE PREPARED: December 2022
DATE REVISED: February 2023
DATE REVISED: March 2023*

PROJECT NUMBER: 622.015.02

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Santa Ana, CA

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PREPARED BY

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16795 VON KARMAN AVE
IRVINE, CA 92606
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MARCH 2023

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1.0 INTRODUCTION

1.1 Geographic Setting

The Related Bristol project site is located in the city of Santa Ana (COSA), and encompasses an approximate total area of 41 acres. The project site is bounded by Bristol Street on the east, Plaza Drive and commercial development on the west, MacArthur Boulevard on the north, and Sunflower Avenue on the south. The project is entirely within Santa Ana, the city of Costa Mesa is directly south of the project site, with the jurisdictional boundary longitudinally along the Sunflower Avenue roadway, just northerly of the center median curb. The APN's are as follows: 412-131-12, -13, -14, -16, -17, -22, -24, -25, and -26.

1.2 Project Site Vicinity Map

A Vicinity Map is included, as Figure 1 below.



Figure 1 – Vicinity Map

1.3 Project Description

The existing 41-acre-site consists of a shopping center with various retail establishments, which comprise approximately 465,000 square feet of commercial/retail development. The site also includes various underground utility infrastructure to support the existing development.

The project proposes to demolish the existing shopping center and related infrastructure, and construct the proposed Related Bristol mixed-use development, with up to 3,750 multi-family residential units; 350,000 square feet of commercial uses; a 250-key hotel; a senior living/continuum of care with 200 units, and approximately 13 acres of open space. Underground and above-ground parking will be provided. A Site Plan is included as Appendix 1 of this report.

1.4 Purpose of this Report

The purpose of this report is to analyze and confirm the following objectives:

- Determine the existing & proposed 2-year storm (hydromodification) and 10- and 100-year (peak) storm flowrates, and 2-year hydromodification storm volume generated within the project site;
- Demonstrate that the proposed condition project flow rates for the various discharge locations, and overall will not exceed that of existing conditions;
- Prepare proposed drainage design to be consistent with existing drainage patterns.
- Provide an evaluation of COSA Master Plan of Drainage (MPD)

1.5 References

- Orange County Hydrology Manual (October 1986);
- Orange County Hydrology Manual Addendum No. 1 (1996);
- Orange County Local Drainage Manual (January 1996);
- Orange County Model Water Quality Management Plan (May 2011);
- Santa Ana Storm Drain Master Plan (SDMP) (December 2018).
- Web Soil Survey (United States Department of Agriculture (USDA, National Resources Conservation Service (NRCS))
- OC Stormwater Program Land Development Tool
- Orange County Flood Control District (OCFCD) as-built plans
- COSA storm drain as-built plans
- CBelow Utility Scanning

2.0 EXISTING TOPOGRAPHY & HYDROLOGIC CONDITIONS

2.1 Existing Topography and Drainage Pattern

The project site is within the COSA Gardens Watershed, and is tributary to the OCFCD Gardens Channel, as presented in the Santa Ana Storm Drain Master Plan (SDMP). Excerpts of the SDMP are included in this report as Appendix 2. The SDMP shows that the site is within subarea 40 of the Gardens Watershed. Subarea 40 is shown to drain toward Bristol Street, Plaza Drive, and Sunflower Avenue. Based on the drainage boundary of Subarea 40, it depicts that the site is not tributary to MacArthur Boulevard. However, based on our evaluation, the northerly portion of the site actually drains toward MacArthur Boulevard, which would place it in subarea 37 to the north. Additional SDMP discussion is included in a later section of this report.

The topography of the project site is relatively flat with storm water draining via surface flows to existing gutters and onsite area drain systems. Based on our evaluation of the existing drainage patterns and as-built plans, and confirmed with scanning results, we have concluded that in the existing condition, about ½ of the site drains northerly, and about ½ of the site drains southerly. However, as discussed above, this differs with what is presented in the SDMP, which shows the entire site draining southerly into the existing storm drain systems in Plaza Drive and Sunflower Avenue, as depicted by subarea 40 of the watershed (Appendix 2).

Based on our evaluation, Callen's Common, a private street that runs east-west through the middle of the site serves as a natural drainage boundary, basically splitting the drainage between the northerly portion of the site which drains to the north, and the southerly portion of the site which drains to the south.

The northerly drainage is conveyed to the city storm drain systems in Plaza Drive, Bristol Street, and MacArthur Boulevard, then to the OCFCD Gardens Channel to the north and northeast.

The southerly drainage, conversely, is conveyed to the city storm drain systems in Plaza Drive and Sunflower Avenue. The drainage is then conveyed easterly in a COSA storm drain in Sunflower Avenue, to the OCFCD Gardens Channel to the east of Bristol Street.

COSA and OCFCD storm drain and channel atlas maps and as-built plans are included in Appendix 3 of this report. The scanning results are included in Appendix 12.

2.2 Existing Storm Drain Facilities

As mentioned above, the drainage of the proposed project is tributary to the COSA owned storm drain facilities in the adjacent city streets, and the drainage is ultimately conveyed to the OCFCD Gardens Channel. The as-built storm drain plans are included in Appendix 3 of this report. Additionally, as discussed in the previous section, the onsite storm drain infrastructure was confirmed with the results of CBelow's utility scanning (Appendix 12).

Based on our investigation, there are three storm drain systems exiting the property at the northerly and northeasterly ends, and three at the southerly end. The northerly and northeasterly storm drain connections are as follows:

- 33-inch storm drain lateral at the corner of Plaza Drive and MacArthur Boulevard
- 30-inch storm drain lateral mid-block in MacArthur Boulevard (between Plaza Drive and Bristol Street)
- 24-inch storm drain lateral in Bristol Street (south of MacArthur Boulevard)

The southerly storm drain connections are as follows:

- 1 connection to the Plaza Drive storm drain (18-inch – 42-inch)
- 1 connection to the Sunflower storm drain (54-inch)

3.0 HYDROLOGY & HYDRAULICS

3.1 Storm Frequency

This study is intended to determine design flowrates and hydromodification volumes for the existing and proposed conditions. Modeling of the existing and proposed condition runoff hydrologic analyses were performed and the 2-year (hydromodification evaluation), 10-year, and 100-year frequency storm events. The city's storm drain infrastructure is designed to 10-year storm event. Additionally, the project will not include any "true sumps", those with no bypass. Therefore, the onsite storm drain will be prepared to comply with the 10-year storm event, while providing secondary overflow to allow runoff to drain to the adjacent roadways. The finished floor of the habitable buildings will be a minimum of 1 foot above the outflow elevations.

The 2-year design storm was analyzed to assess whether a HCOC exists at the project site which included analyzing the pre vs post development time of concentration and runoff volume. Discussions of HCOC are included in the PWQMP.

This study will meet the requirement of Orange County Hydrology Manual regarding 100-yr storm event. The combined capacity of Storm Drain and Street will carry the runoff within the theoretical right-of-way (R/W) through the private development, and to the public streets fronting the site. Any upsizing and modification to Storm Drain in R/W line will verify this requirement

3.2 Methodology

This study was prepared in accordance with the Orange County Hydrology Manual and the Orange County Local Drainage Manual and utilized storm event return periods of 2-year, 10-year, and 100-year to describe pre- vs post-development drainage characteristics.

Computer programs were used to perform hydrologic analyses. Advanced Engineering Software (AES) HydroWIN v.2016 Rational Method and Unit Hydrograph Analyses were utilized to compile the hydrologic data and calculate peak flow discharge rates and hydromodification (2-year) volumes.

A Soil Classification Report, which is included in Appendix 4 of this report, was obtained from the Natural Resources Conservation Service (NRCS) Web Soil Survey and utilized in determining the project site hydrologic soil group classification as type "C". Additionally, discussions and correspondence with the geotechnical engineer with Group Delta, along with the evaluation of the Orange County Stormwater Program Land Development Tool has confirmed that the project is within soil type "C". These references, as well as the email from the geotechnical engineer confirming the soil type "C", are provided in Appendix 4.

3.3 Hydrology

The existing and proposed conditions consist of generally similar drainage boundary characteristics with a high percentage of impervious area and an initial sub-area of sheet flow converging to either channelized or pipe flow prior to discharge from the site. In both the existing and proposed conditions, runoff is discharged to the existing storm drain and/or roadways fronting the project.

The existing and proposed condition Rational Method hydrologic modeling and calculation data are included in Appendix 5 and Appendix 7 respectively, and the existing and proposed hydrology maps are included in Appendix 6 and Appendix 8 respectively of this report. The existing and proposed condition unit hydrograph calculation data (2-year; hydromodification) are included in Appendix 9 and Appendix 10 respectively of this report.

3.4 Storm Drain Hydraulics

Flowmaster computer program was utilized to evaluate the hydraulic capacity of the offsite storm drain systems. The calculations are included in Appendix 11 of this report.

3.5 COSA Storm Drain Master Plan Review

As mentioned previously, the project site is within the Gardens Watershed, included in the SDMP. The SDMP provides recommended storm drain upgrades based on the hydrologic analysis. Additionally, the SDMP provided recommended upgrades to the city's storm drain infrastructure based on the results of the hydrologic analysis. It is our opinion that due to the subarea delineation discrepancy of subarea 40 adjacent to MacArthur Boulevard, there is a possibility that the recommended upgrades presented in the SDMP would not be as extensive as shown.

Fusco requested and received the backup AES Rational Method calculations (10-year storm event) and drainage map from the city's consultant, and had evaluated them to confirm the drainage patterns and recommendations included in the SDMP. The calculations and drainage map are included for reference as Appendix 13.

Based on our review of the SDMP calculations and drainage map, it is our opinion that the recommendations provided in the SDMP would not be required to be as extensive as shown in

the SDMP. Fuscoe has prepared and provided the city with a Technical Memorandum assessing our review of this portion of the Gardens Watershed, as a separate document.

4.0 RESULTS AND CONCLUSIONS

4.1 Drainage Comparison (Q10)

The results of the hydrologic analysis show that the proposed condition runoff at any of the discharge locations surrounding the site will not exceed the existing condition runoff. The existing storm drain infrastructure is designed for a 10-year storm event. Table 1 presents the comparison of existing and proposed conditions, including location, existing storm drain, acreage, and Q10 runoff.

Table 1

<i>Related Bristol Drainage Comparisons</i>							
			Existing		Proposed		
Line	Out-fall #	Existing SD	Acreage	Q10 (cfs)	Acreage	Q10 (cfs)	Difference (Proposed – Existing)
MacArthur Boulevard	#1	30" lateral to 63" SD (Dwg. No. HF-47-12 / Dwg. No. I-36-9)	14.11 ac	35 cfs	13.1 cfs	32.7 cfs	-2.3
	#2	30" lateral to 63" SD (Dwg. No. I-36-9)					
Bristol Street	#3	24" lateral (Dwg. No. I-13-8)	6.1 ac	17.1 cfs	5.78 ac	13.2 cfs	-3.9
Plaza Drive	#4	36" SD (Dwg. No. HF-47-12)	1.16 ac	4 cfs	1.1 ac	2.6 cfs	-1.4
Sunflower	#5	54" SD (Dwg. No. HF 18-58)	19.78 ac	50.7 cfs	21.1 cfs	49.6 cfs	-1.1
	#6						
	#7						
Total			41.15 ac	106.8 cfs	41.15 ac	98.2 cfs	For all lines, the proposed condition Q is less than the existing

4.2 Drainage Comparisons (Q2, Q10, Q100)

The following tables show the results of the hydrologic analysis prepared for this study for the other storm events.

Table 2 – Runoff Rates 2-year storm

Line	2-year Storm Event	
	Existing Condition	Proposed Condition
MacArthur Boulevard	18.3	17.8
Bristol Street	9.4	7.3
Plaza Drive	2.2	1.4
Sunflower Avenue	27.3	27.1
Totals	57.2	53.6

Table 3 – Runoff Rates 10-year storm

Line	10-year Storm Event	
	Existing Condition	Proposed Condition
MacArthur Boulevard	35.1	32.7
Bristol Street	17.1	13.2
Plaza Drive	4.0	2.6
Sunflower Avenue	50.7	49.6
Totals	106.9	98.1

Table 4 – Runoff Rates 100-year storm

Line	100-year Storm Event	
	Existing Condition	Proposed Condition
MacArthur Boulevard	55.2	50.6
Bristol Street	26.3	20.2
Plaza Drive	6.0	4.0
Sunflower Avenue	78.8	76.4
Totals	166.3	151.2

These hydrologic results demonstrate that the site-specific overall post development stormwater runoff will not increase as compared to the existing condition for any of the discharge locations. Therefore, the proposed development would not adversely impact existing drainage facilities. Additionally, water quality treatment is evaluated in the PWQMP for this project.

Appendix 1

Site Plan

GROUND FLOOR PLAN

NORTH PHASE

SOUTH PHASE

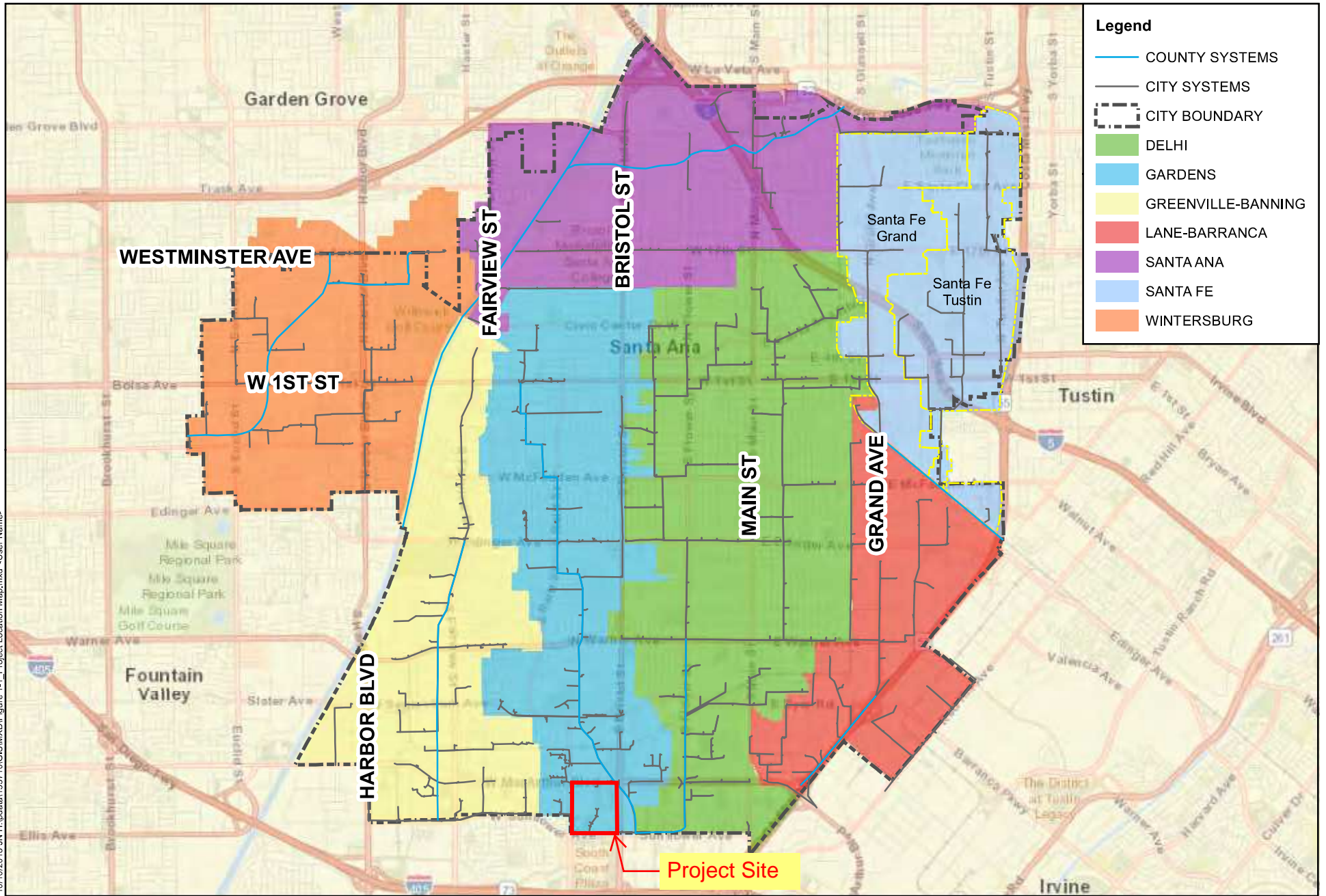
- LEGEND**
- RESIDENTIAL
 - SENIOR CONTINUUM CARE
 - HOTEL
 - RETAIL



Appendix 2

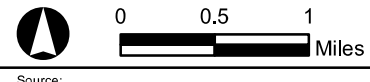
Santa Ana Master Plan of Drainage Excerpts

10/10/2018 JN H:\pdata\153710\GIS\MXD\Figure 1-1_Project Location Map.mxd <User Name>



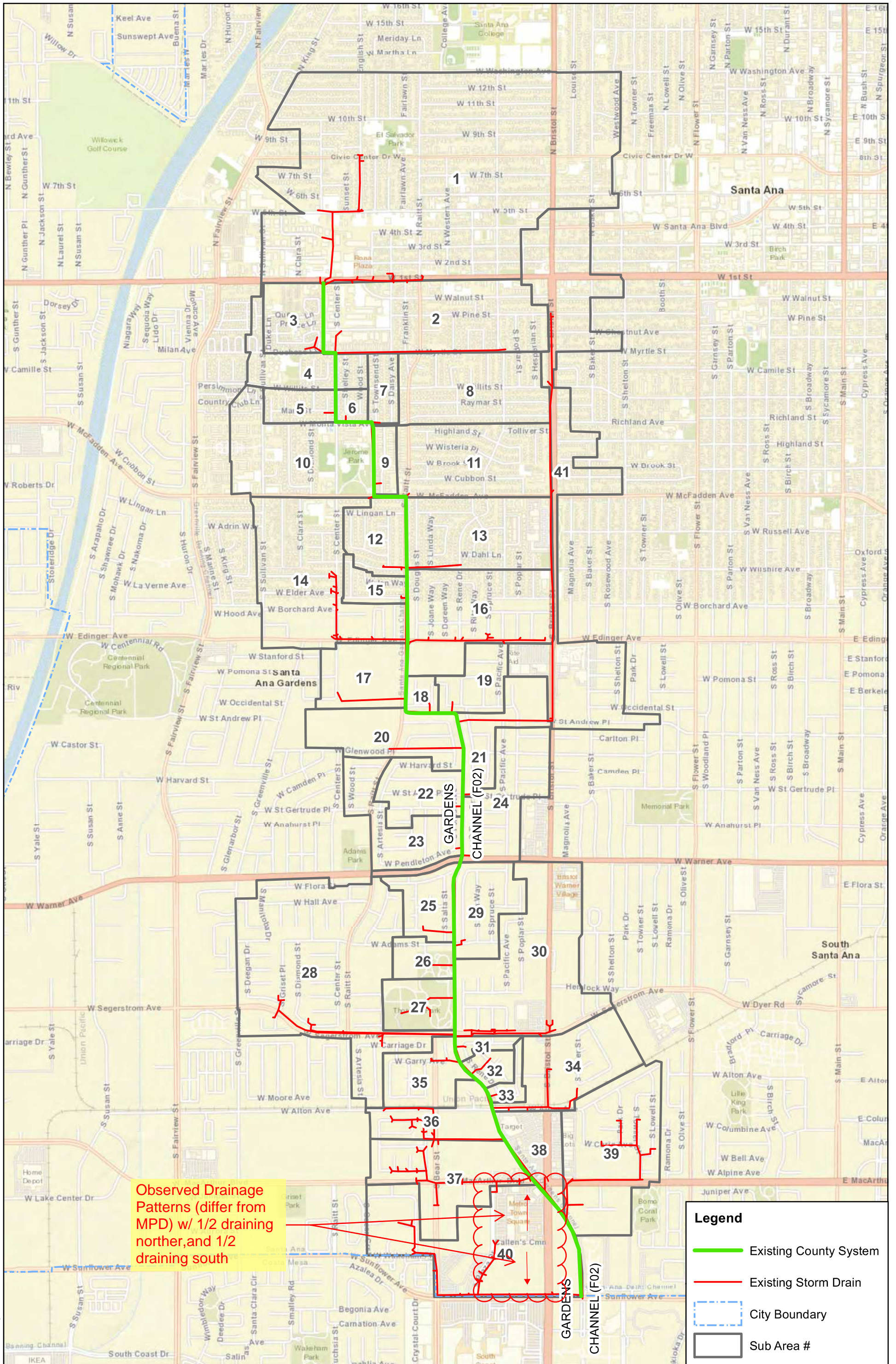
Legend

- COUNTY SYSTEMS
- CITY SYSTEMS
- CITY BOUNDARY
- DELHI
- GARDENS
- GREENVILLE-BANNING
- LANE-BARRANCA
- SANTA ANA
- SANTA FE
- WINTERSBURG



SANTA ANA MASTER PLAN OF DRAINAGE
Project Location Map

Figure 1-1



Observed Drainage Patterns (differ from MPD) w/ 1/2 draining north, and 1/2 draining south

- Legend**
- Existing County System
 - Existing Storm Drain
 - City Boundary
 - Sub Area #

9/21/2017 JN.H:\pda\1537\GIS\MXD\Watersheds\Gardens\Santa Ana - Gardens - Sub Areas.mxd -USER NAME-

Appendix 3

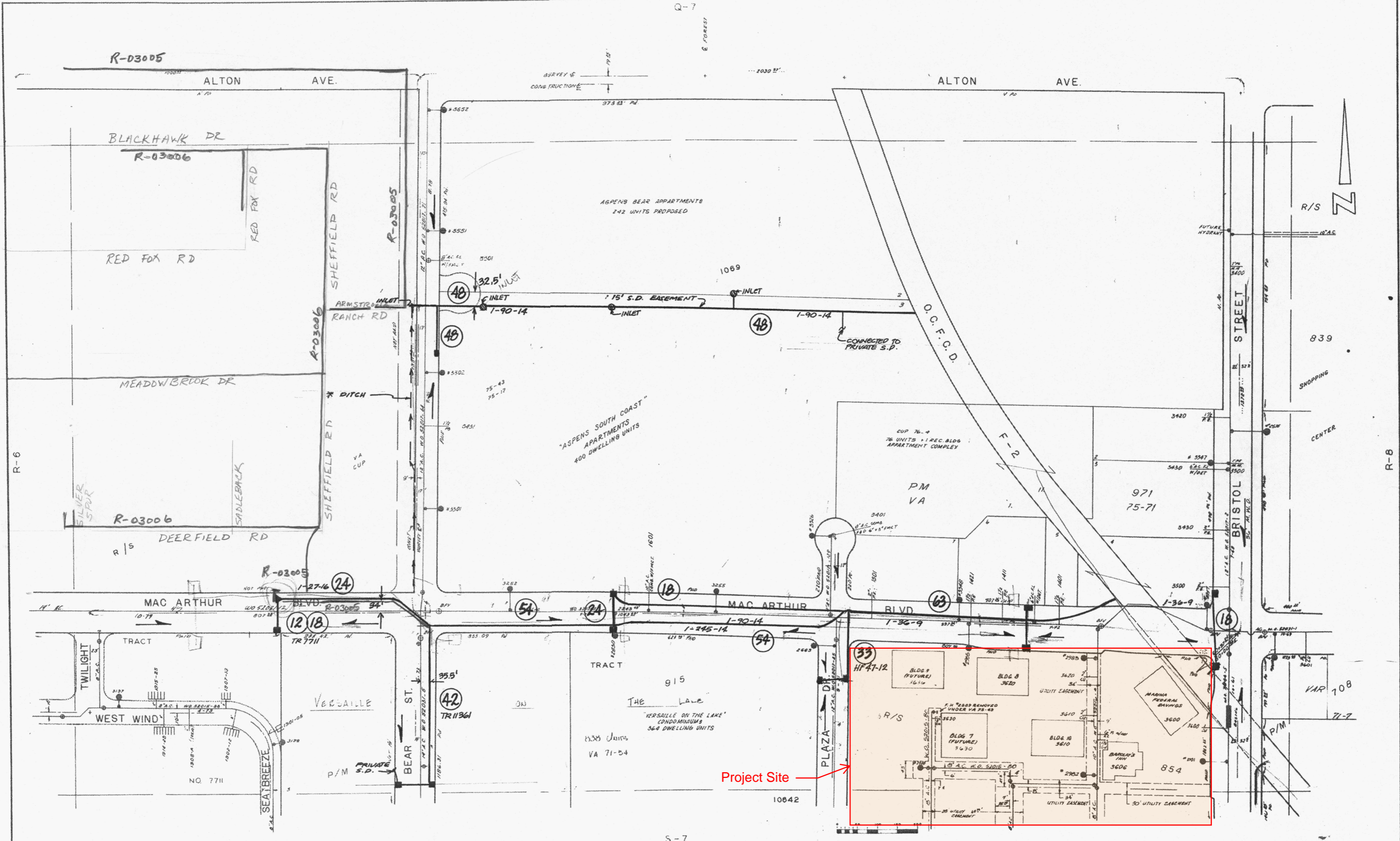
Storm Drain As-Built Plans

1081

ATLAS MF 5473

Storm Drain

R-7



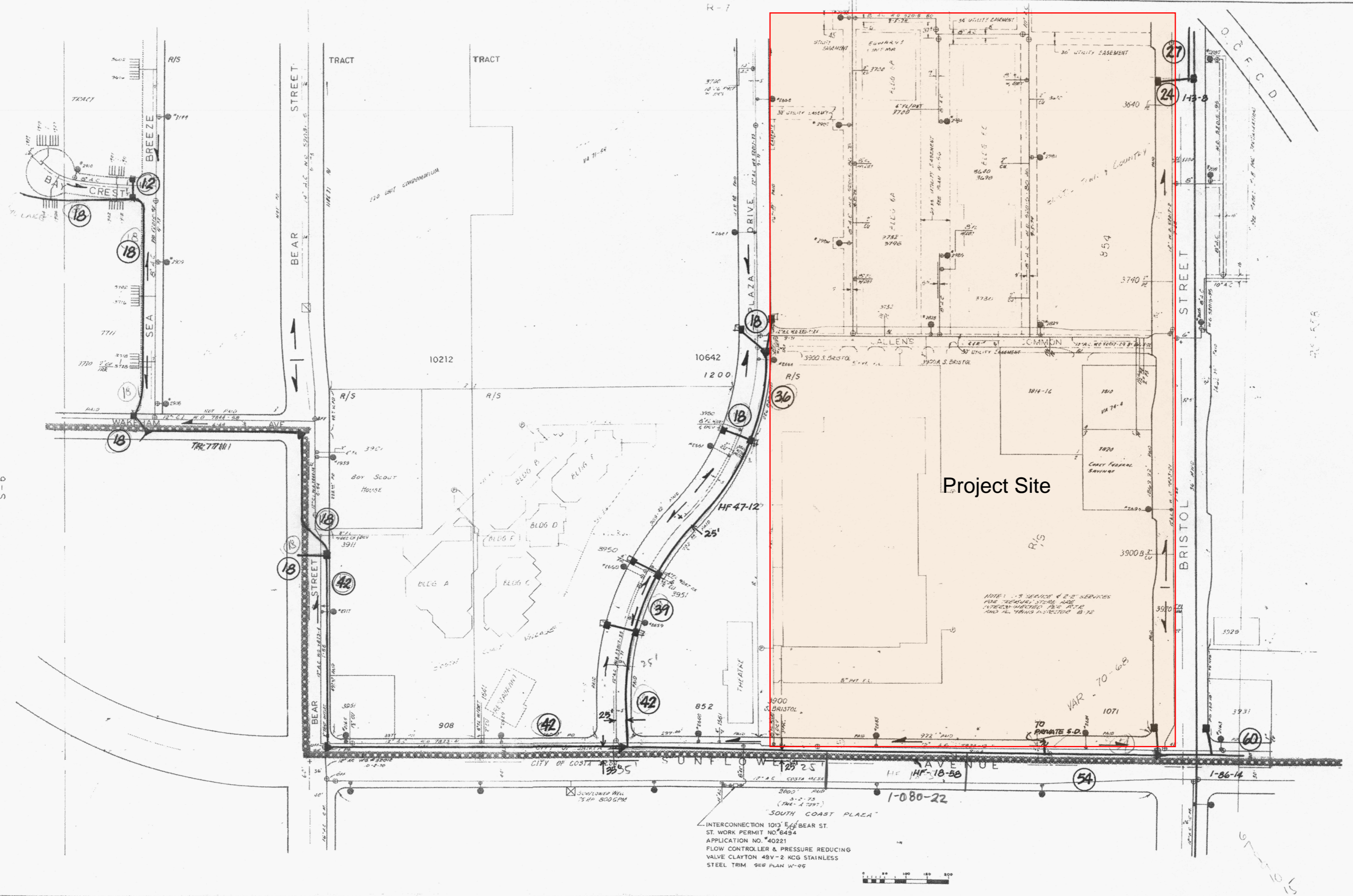
EXISTING
 PROPOSED
 1-29-15

LOCAL FACILITY
 O.C.F.C FACILITY
 MAJOR DRAINAGE BOUNDARY
 SUB-AREA BOUNDARY
 STREET FLOW DIRECTION
 SANTA PLAN NUMBER

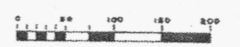
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 □ REINFORCED CONCRETE BOX (RCB), (BASE WIDTH BY HEIGHT IN FEET)
 ▽ TRAPEZOIDAL CHANNEL (BASE WIDTH BY HEIGHT IN FEET)
 ■ CATCH BASIN (LENGTH IN FEET)
 ▲ MANHOLE
 ● FIRE HYDRANT
 * SPECIAL NOTE

SCALE: 1" = 200'
 DESIGNED
 DRAWN
 CHECKED
 R/W APPROVED
 RECOMMENDED
 APPROVED
 R.E. NO.

DEPARTMENT OF PUBLIC WORKS
 CITY OF SANTA ANA
 SHEET NO. OF R-7



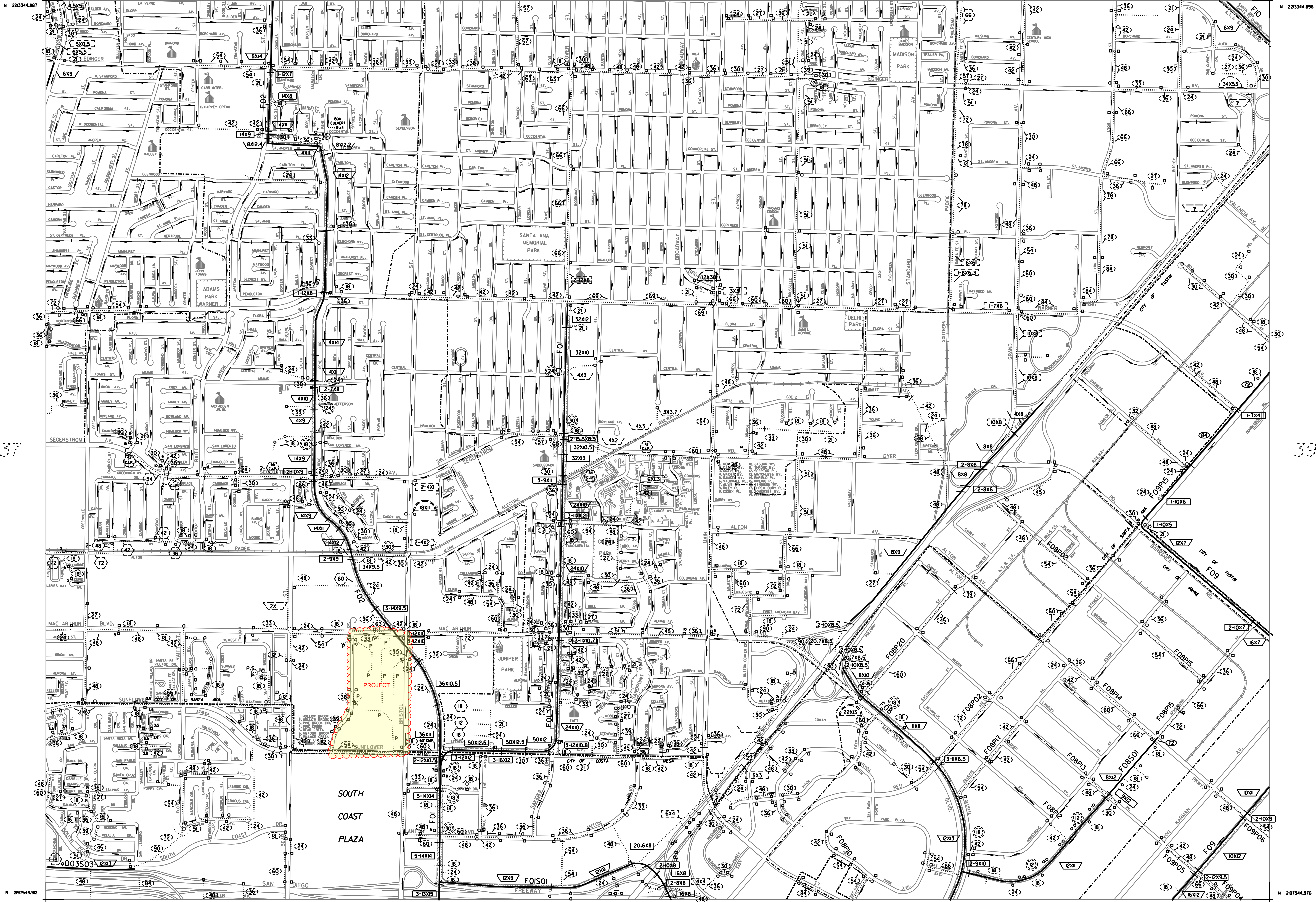
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 ST. WORK PERMIT NO. 6494
 APPLICATION NO. 40221
 FLOW CONTROLLER & PRESSURE REDUCING
 VALVE CLAYTON 49V-2 KCG STAINLESS
 STEEL TRIM 918 PLAN W-05



EXISTING	PROPOSED	
		LOCAL FACILITY
		O.C.F.C FACILITY
		MAJOR DRAINAGE BOUNDARY
		SUB-AREA BOUNDARY
		STREET FLOW DIRECTION
		SANTA PLAN NUMBER

- REINFORCED CONCRETE PIPE (RCP), (DIAMETER IN INCHES)
- REINFORCED CONCRETE BOX (RCB), (BASE WIDTH BY HEIGHT IN FEET)
- ▤ TRAPEZOIDAL CHANNEL (BASE WIDTH BY HEIGHT IN FEET)
- CATCH BASIN (LENGTH IN FEET)
- ▲ MANHOLE
- FIRE HYDRANT
- * SPECIAL NOTE

SCALE	DATE
1" = 200'	
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CHECKED	
R/W APPROVED	
RECOMMENDED	
APPROVED	
R.E. NO.	

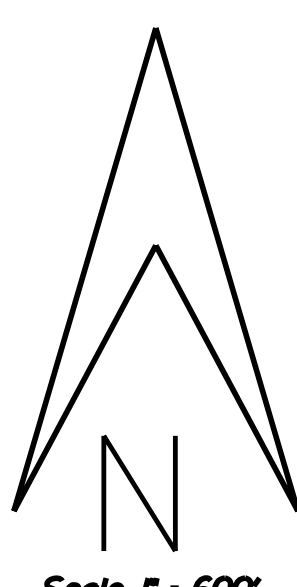


37

39

38

38



NOTICE

This drainage map has been prepared for information purposes only. The location and ownership of facilities have been determined from available information provided by public agencies, but may not be exact. The user of this map is responsible for verifying exact location, ownership and regional versus local character of drainage facilities.

Additional information may be obtained from public plans and recorded deeds. Character designations shown on this map are for convenience only and are not controlling. Neither the county of Orange nor the Orange County Flood Control District (OCFCD) assumes any liabilities for inaccuracies of this map.

To notify the Resources & Development Management Department (RDMD) of additions or corrections, please call Sal Gutierrez at (714) 834-5396 or by email at salgutierrez@ocfcd.gov

ORANGE COUNTY FLOOD CONTROL DISTRICT			
BASEMAP OF DRAINAGE FACILITIES IN ORANGE COUNTY			
REVISION	DATE	SHEET NO.	DWG. NO.
APV	JAN/12/2000	38	MAPS-II3-3

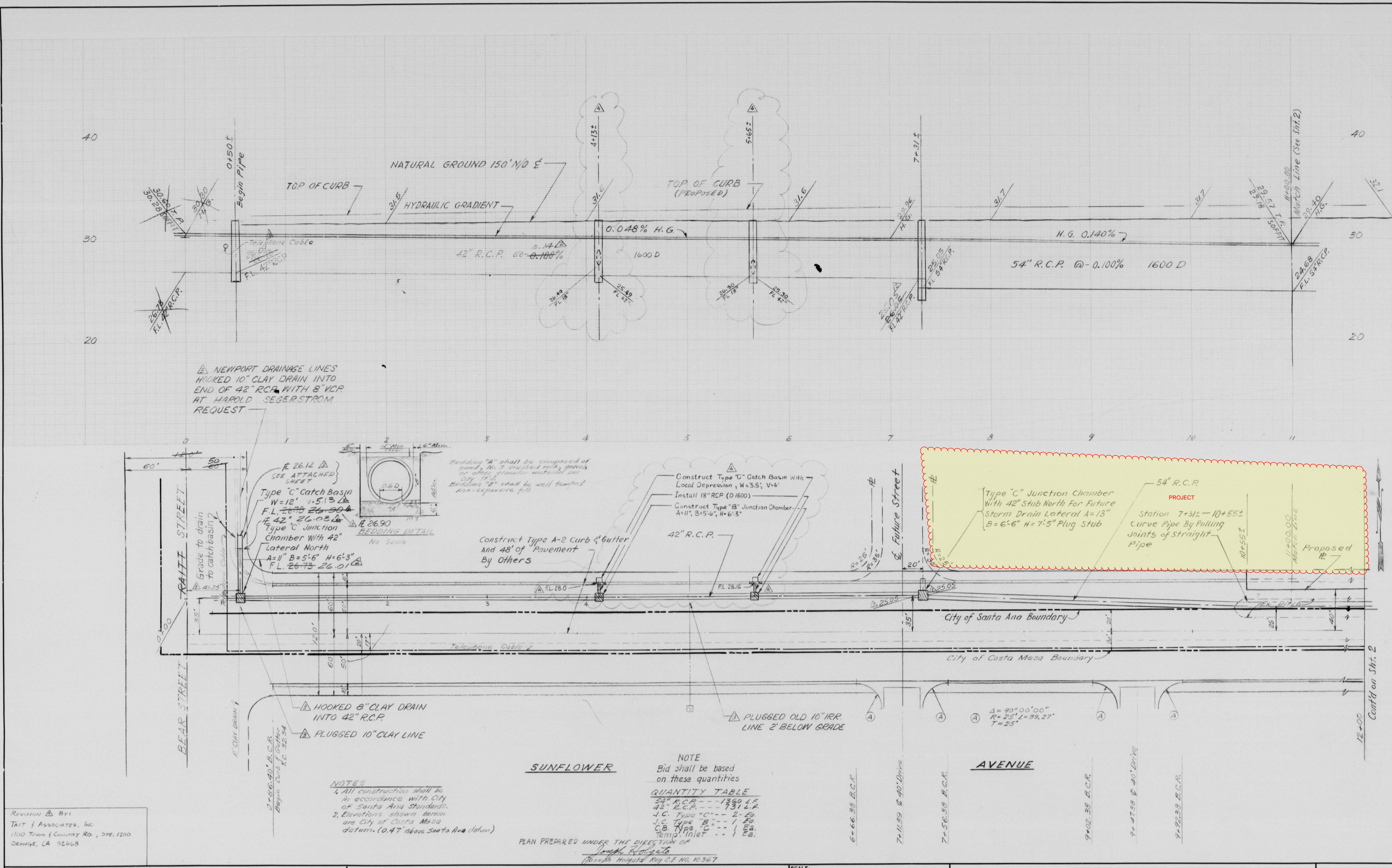
Existing OCFCD		Existing LOCAL	
	Channel Drainage Area Boundary		Earth Trapezoidal Channel (base width by height in feet)
	Major Sub-Area Drainage Boundary		Reinforced Concrete Trapezoidal Channel (base width by height in feet)
	Minor Sub-Area Drainage Boundary		Reinforced Concrete Rectangular Channel (base width by height in feet)
	Existing OCFCD Facility		Reinforced Concrete Box (RCB) (number of barrels-span by height in feet)
	Existing Local Facility		Reinforced Concrete Pipe (RCP) (diameter in inches)
	Existing Retarding Basin or Reservoir		Metal Steel Channel (MSC) (base width by pite height in feet/pite length in feet)
	Natural Watercourse		Corrugated Metal Pipe (CMP) (diameter in inches)
	City Limits		Concrete Pipe (diameter in inches)
	Granddirt		Concrete Oval Pipe (width by height in inches)
	Pump Station		Steel Pipe (diameter in inches)
	Catch Basin (length in feet)		Reinforced Concrete Arch (base span by height in inches)
	Drop Inlet or Other Entry		Stone
	Ownership (if other than City or County)		Corrugated Metal Arch (base span by height in inches)
	Private		
	State		
	Federal		

DRAWING NUMBER
1 of 2

DRAWING NUMBER

DRAWING NUMBER
Sunflower Ave Storm Drain
Kaitt St Station 11+00

DRAWING NUMBER
HF 18-58



REVISIONS BY:
TAIT & ASSOCIATES, INC.
1700 TOWN & COUNTRY RD., STE. 1200
ORANGE, CA 92668

NOTES
1. All construction shall be in accordance with City of Santa Ana Standards.
2. Elevations shown herein are City of Costa Mesa datum. (0.47' above Santa Ana datum)

NOTE
Bid shall be based on these quantities

QUANTITY TABLE	
54" R.C.P.	1360 LF
42" R.C.P.	131 LF
I.C. Type "C"	2 Ea.
I.C. Type "B"	1 Ea.
C.B. Type "C"	1 Ea.
Temp. Inlet	1 Ea.

PLAN PREPARED UNDER THE DIRECTION OF
Joseph Rodriguez
Professional Engineer No. 10367

NUMBER	DATE	INITIALS	DESCRIPTION	APP'VD
1	5/18/93	MS	DETAIL A	
2	5/18/93	MS	FIELD CHANGE	
3	5/18/93	MS	AS CONSTRUCTED	
4	5/18/93	MS	Added C.B., 18" R.C.P. & I.C. @ STA 4+13 & 5+65	

REFERENCES	
BENCH MARK	B.M. NO. 58-3A12-5 " + " North Edge 40' Dia. Standpipe 2' High, S.E. Corner Bear Sp. of Sunflower Ave per Circuit No. 1, Book 1002, Elev. 34.67' This Plan = 34.20' Santa Ana Datum.

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

DESIGNED BY: *W. T. G. G. G. G. G.*
DRAWN: *Carina*
CHECKED: *MS*
R/W APPROVED: *MS*
APPROVED: *MS*
R.E. NO. *MS*

DATE: 4-20-93

SUNFLOWER AVENUE STORM DRAIN
FROM KAITT ST (BEAR ST) TO STATION 11+00

DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA
MIF
SUNFLOWER
687507-5

SHEET NO. 1 OF 2

18-58

8591

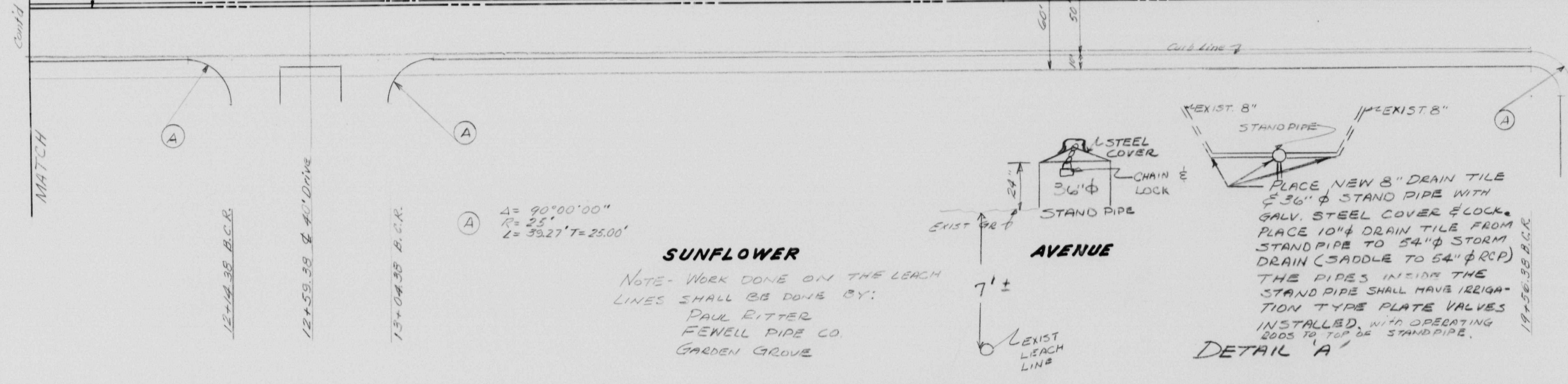
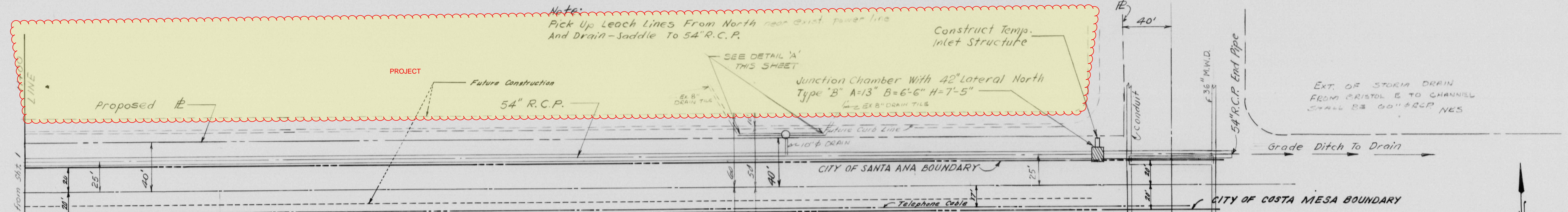
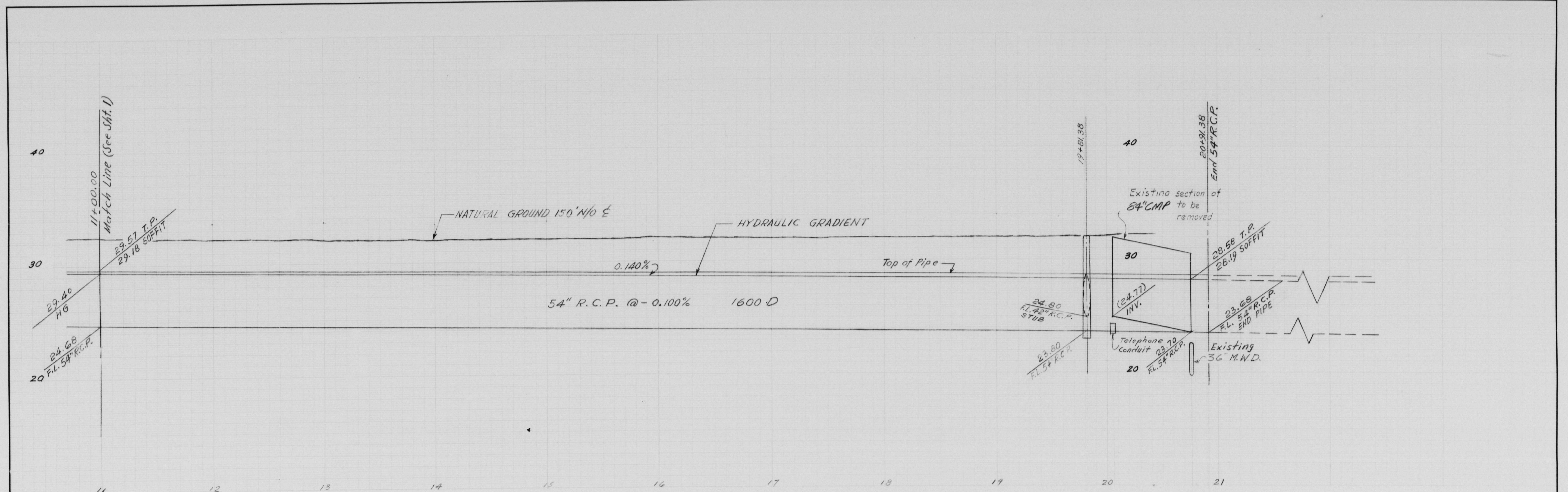
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DRAWING NUMBER
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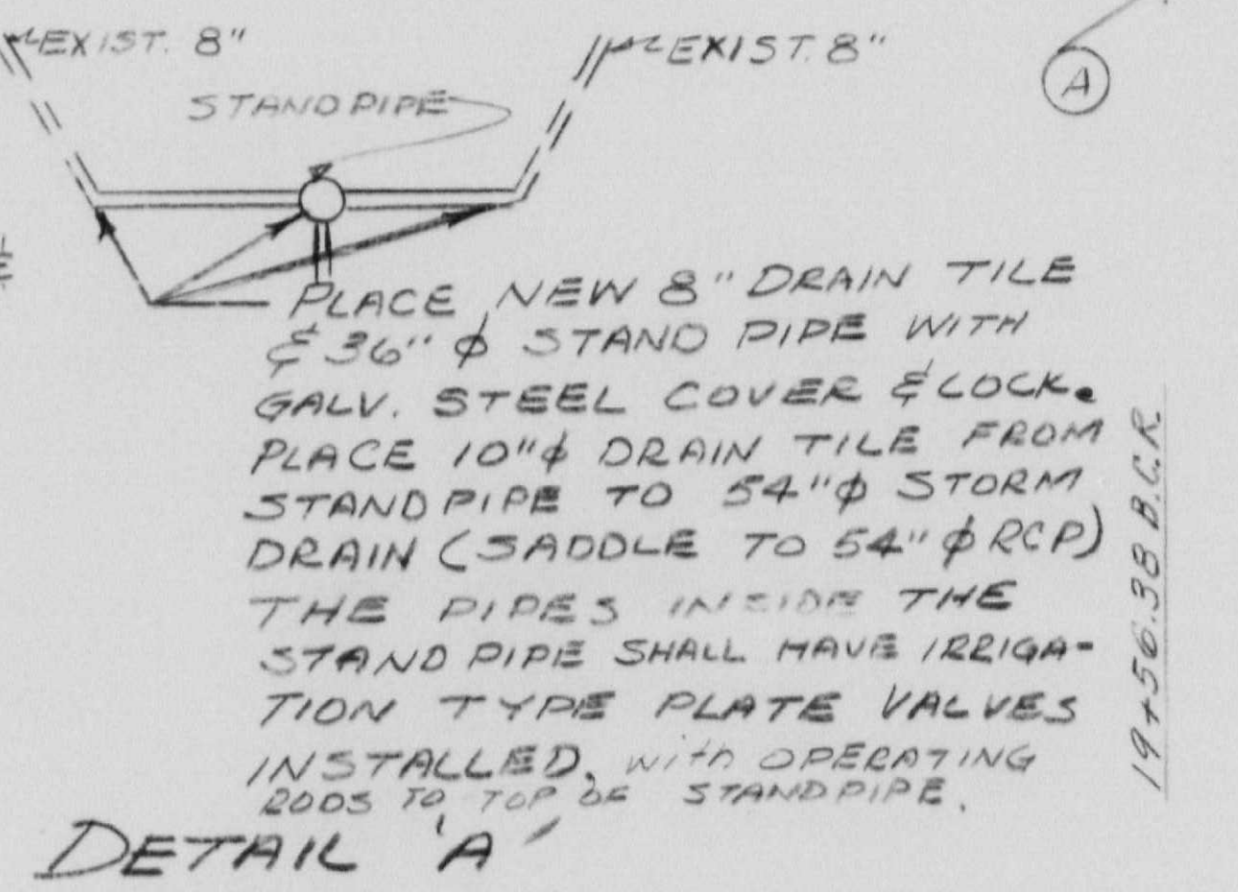
DRAWING NUMBER
Sunflower Ave Storm
Drainage Station 11+00
Station 19+56.38

DRAWING NUMBER
HF 18-58

18-58



SUNFLOWER AVENUE
NOTE - WORK DONE ON THE LEACH LINES SHALL BE DONE BY:
PAUL RITTER
FENEILL PIPE CO
GARDEN GROVE



NOTES
1. All construction shall be in accordance with City of Santa Ana Standards.
2. Elevations shown herein are City of Costa Mesa datum.
BEDDING DETAIL: Shown on Sheet No. 1

REVISIONS				
NUMBER	DATE	INITIALS	DESCRIPTION	APP'D.
1	5/2/65	NKS	DETAIL A	
2	5/13/65	MW	AS CONSTRUCTED	

REFERENCES	

SCALE:	DATE
Horizontal: 1" = 40' Vertical: 1" = 4'	4-20-65
DESIGNED	
DRAWN	
CHECKED	2/65
R/W APPROVED	
RECOMMENDED	4/22/65
APPROVED	
R. E. NO. 3512	R. E. Wolford 4/22/65

SUNFLOWER AVENUE STORM DRAIN
FROM STATION 11+00 TO STATION 19+56.38

DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA

SHEET NO. 2 OF 2

18-58

PLAZA DRIVE: SUNFLOWER AVE - MACARTHUR BLVD

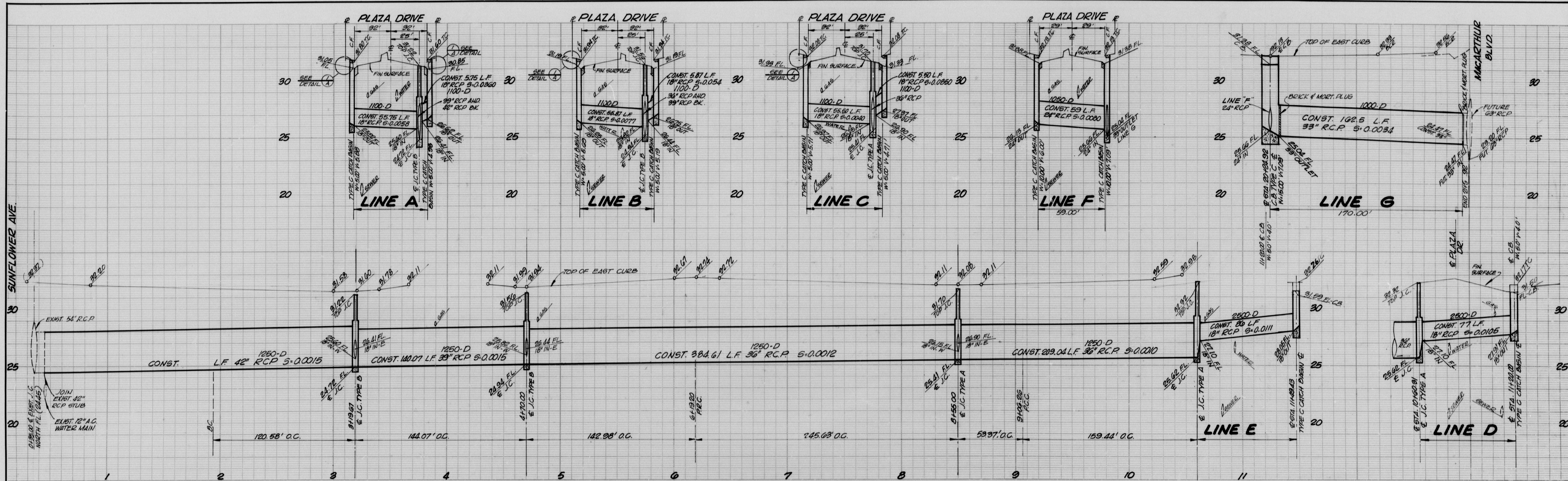
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9/71

STORM DRAIN
VA: 71-4

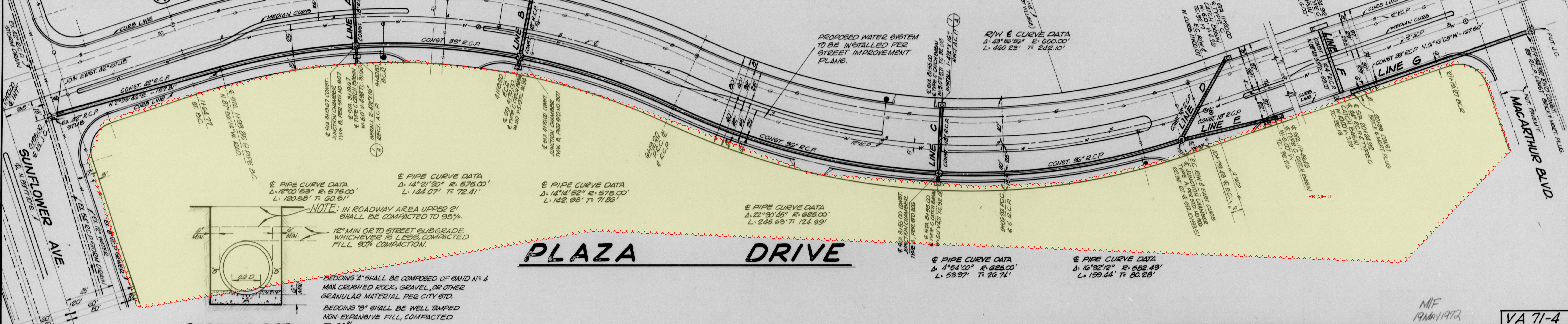
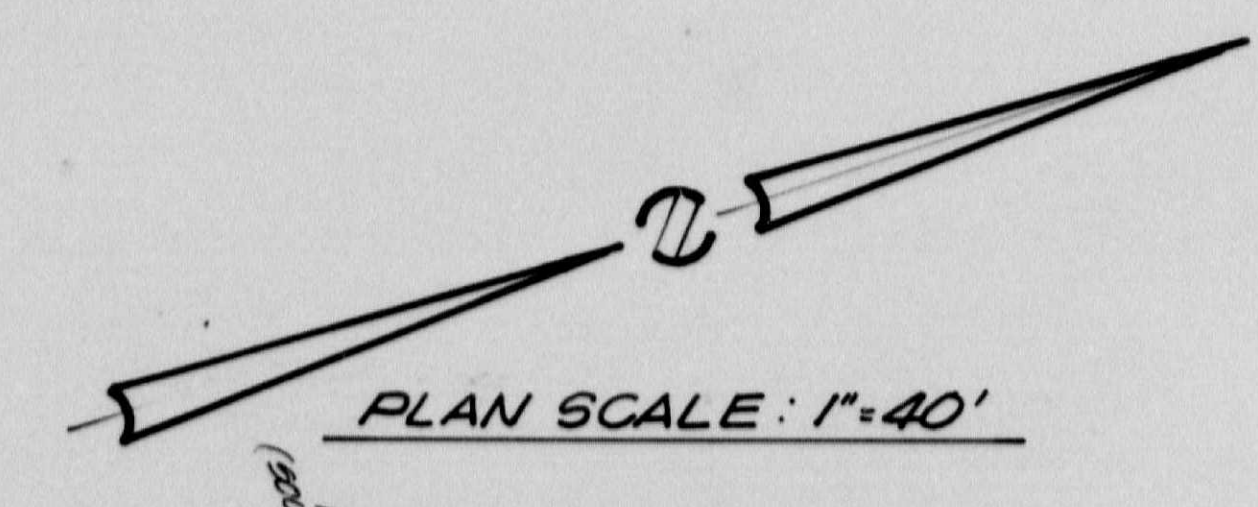
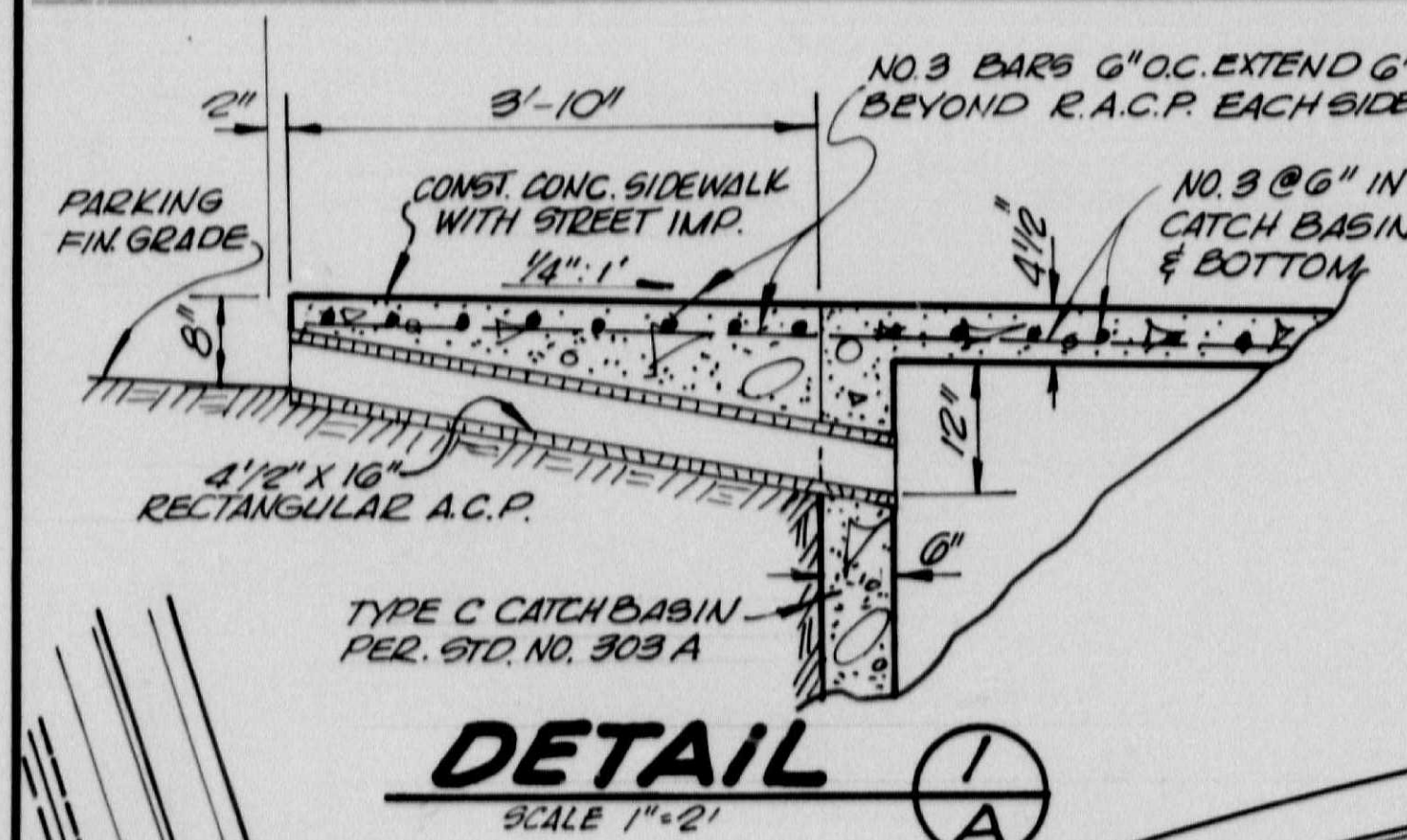
HF: 47-12

ME 6.26.71



GENERAL NOTES

1. ALL WORK SHOWN HEREON SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PROVISIONS OF THE STD SPECIFICATIONS OF THE CITY OF SANTA ANA.
2. ALL CATCH BASIN TYPE "C" HEREON SHALL BE PER STD NO. 303A.
3. PROFILE STATIONING IS ALONG G.



REVISIONS			
NUMBER	DATE	INITIALS	DESCRIPTION
1	9-1-71	ME	AS BUILT - NO CHANGES

REFERENCES	
BENCH MARK:	ELEV. 35.91
	58-6A 29-6 MON. ON E - E ALTON & BRISTOL
	(BELOW SURFACE IN CAPPED WELL)

PREPARED UNDER THE SUPERVISION OF	
DESIGNED	P.N.D.
DRAWN	D.M.
CHECKED	C.B.
R/W APPROVED	
RECOMMENDED	C.M.
APPROVED	M. J. Stevens
ARBITRARY DIRECTOR OF PUBLIC WORKS	8-3-71

TOUPS ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS - 1801 N. COLLEGE AVE., SANTA ANA CALIF. 92704-4431

PLAZA DRIVE - STORM DRAIN
SUNFLOWER AVENUE TO MACARTHUR BLVD.
DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA

PROJECT NO. VA 71-4
SHEET NO. 3 OF 3.4

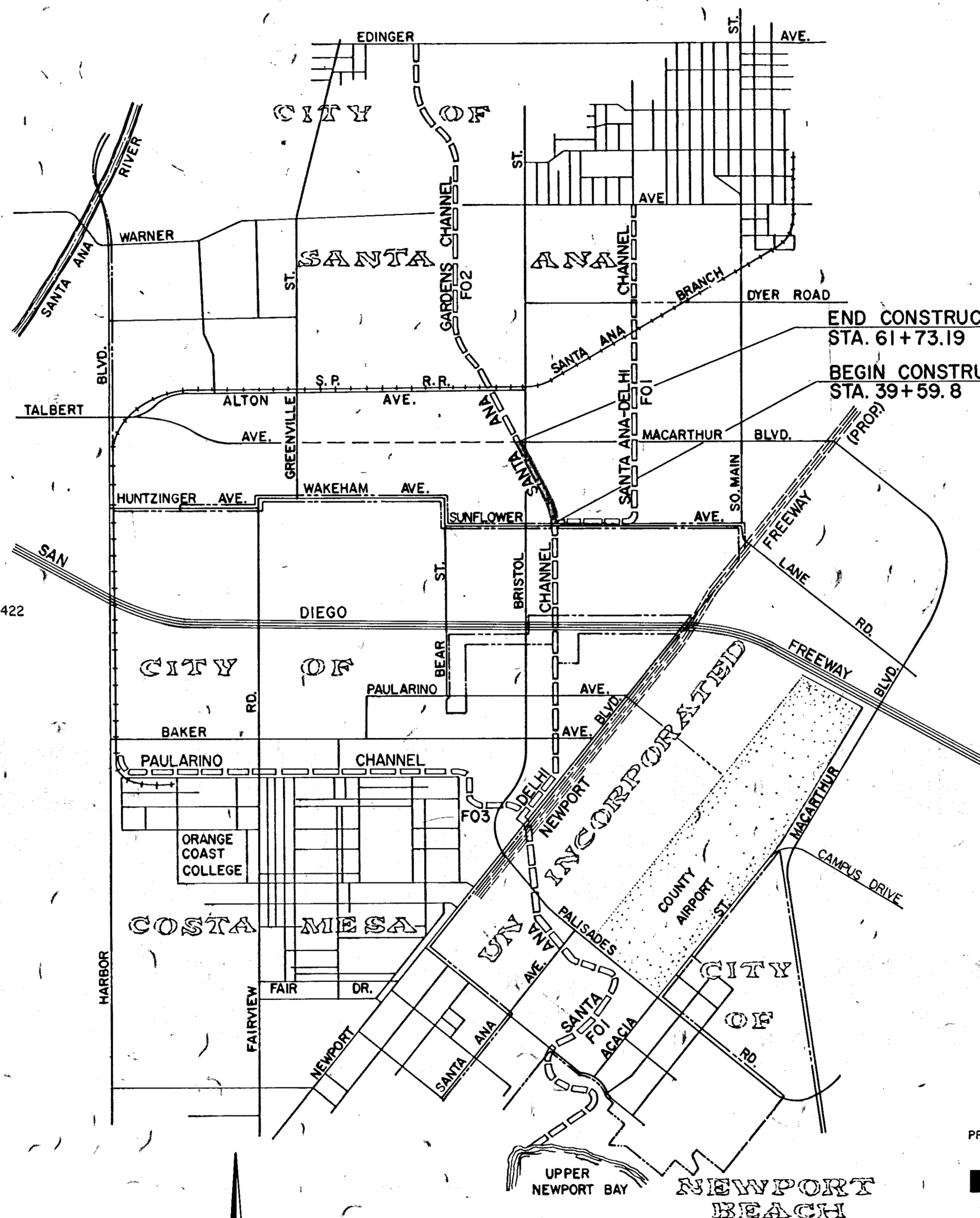
F02-701-1-A 1012

INDEX TO DRAWINGS

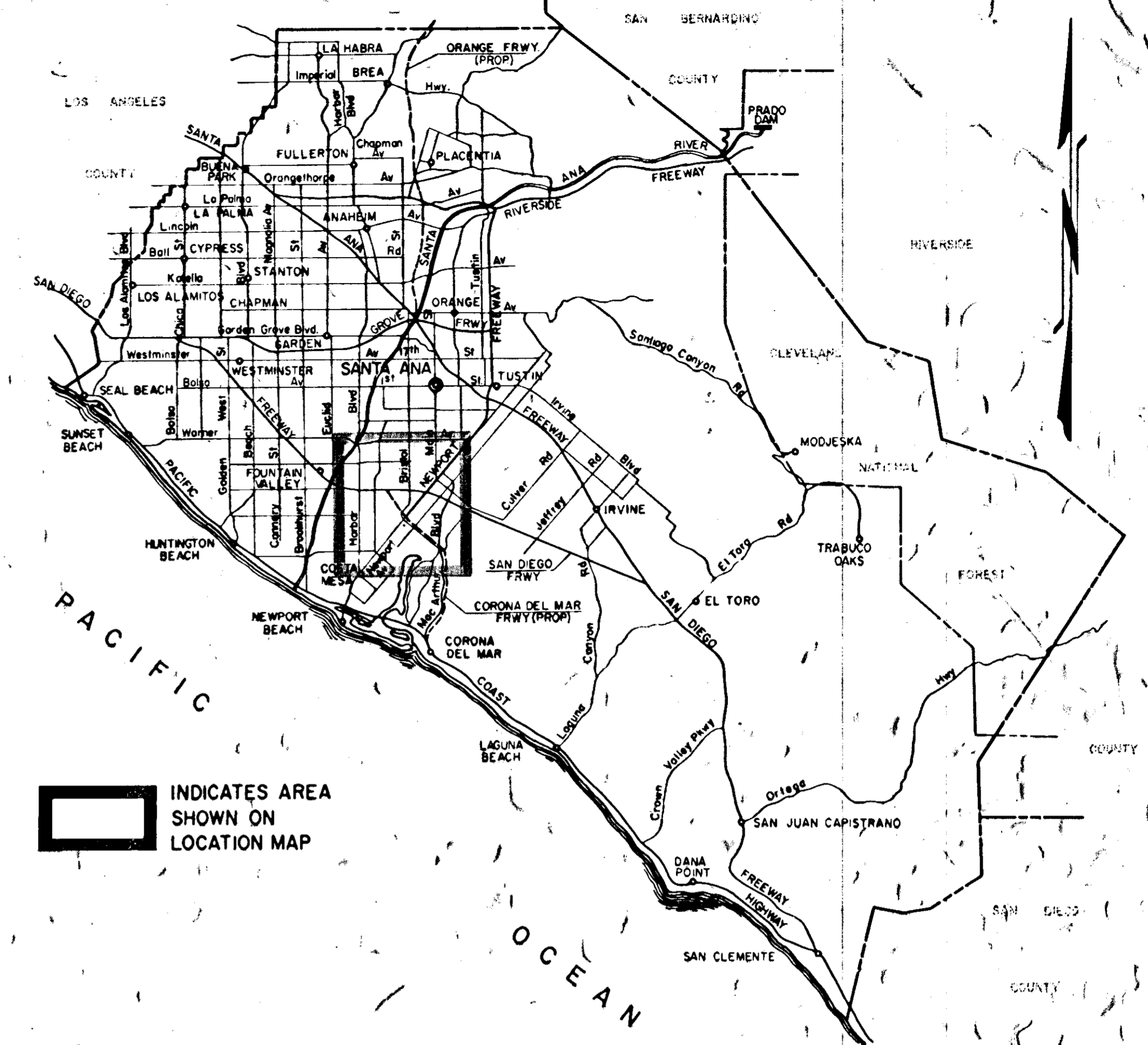
SHEET NO.	TITLE
1	TITLE SHEET
2	PLAN & PROFILE STA. 39+59.8 TO STA. 47+00.
3	PLAN & PROFILE STA. 47+00 TO STA. 57+00.
4	PLAN & PROFILE STA. 57+00 TO STA. 61+73.19.
5	BRISTOL STREET CROSSING.
6	STRUCTURAL DETAILS.
7	TRIPLE R.C. BOX, STRUCTURAL & EARTHWORK DETAILS.
8	TRANSITION DETAIL AT SUNFLOWER AVE, MACARTHUR BLVD., STRUCTURAL AND MISCELLANEOUS DETAILS.
9	TRANSITION DETAIL AT DOWNSTREAM END OF TRIPLE 12' X 10' R.C.B., EARTHWORK DETAILS & LOG OF TEST BORINGS.
10	BRISTOL STREET DETOUR.
11	TYPICAL FENCE AND GATE DETAILS.
12	OPTIONAL TRANSITION DETAIL AT DOWNSTREAM END OF TRIPLE 12' (W) X 10' (H) R.C.B. AND RETAINING WALL DETAILS.

UTILITY LEGEND

	SYMBOL	PHONE NO.
ORANGE CO. SANITATION DIST.	-S-	714-540-2910
PACIFIC TELEPHONE CO.	-T-	714-557-1226
MR. JOSEPH CALLENS	IRRIG. PIPE Q-STAND PIPE	714-962-1212
METROPOLITAN WATER DIST.	EX. 36" M.W.D. EXIST. VENT	213-626-4282 EXT. 422
CITY OF SANTA ANA	-W-	714-834-4922
SOUTHERN CALIF GAS CO.	-G-	714-542-4121



END CONSTRUCTION
STA. 61+73.19
BEGIN CONSTRUCTION
STA. 39+59.8



**ORANGE COUNTY, CALIFORNIA
VICINITY MAP**



**SANTA ANA - GARDENS CHANNEL
FROM SUNFLOWER AVENUE TO MACARTHUR BLVD.**

FACILITY NO. F02
MARCH 1972

PREPARED IN THE OFFICES OF:

vtm orange county
ENGINEERS ARCHITECTS PLANNERS
2301 CAMPUS DRIVE, IRVINE, CALIFORNIA 92664
(714) 833-2450

SUBMITTED BY:

Antonio Williams 2/25/72
R.C.E. NO. 18046 DATE

APPROVED: *A.G. Osborne*
CHIEF ENGINEER

APPROVED: *P.E. Wilson*
FOR THE CITY OF SANTA ANA

ORANGE COUNTY FLOOD CONTROL DISTRICT
SANTA ANA CALIFORNIA

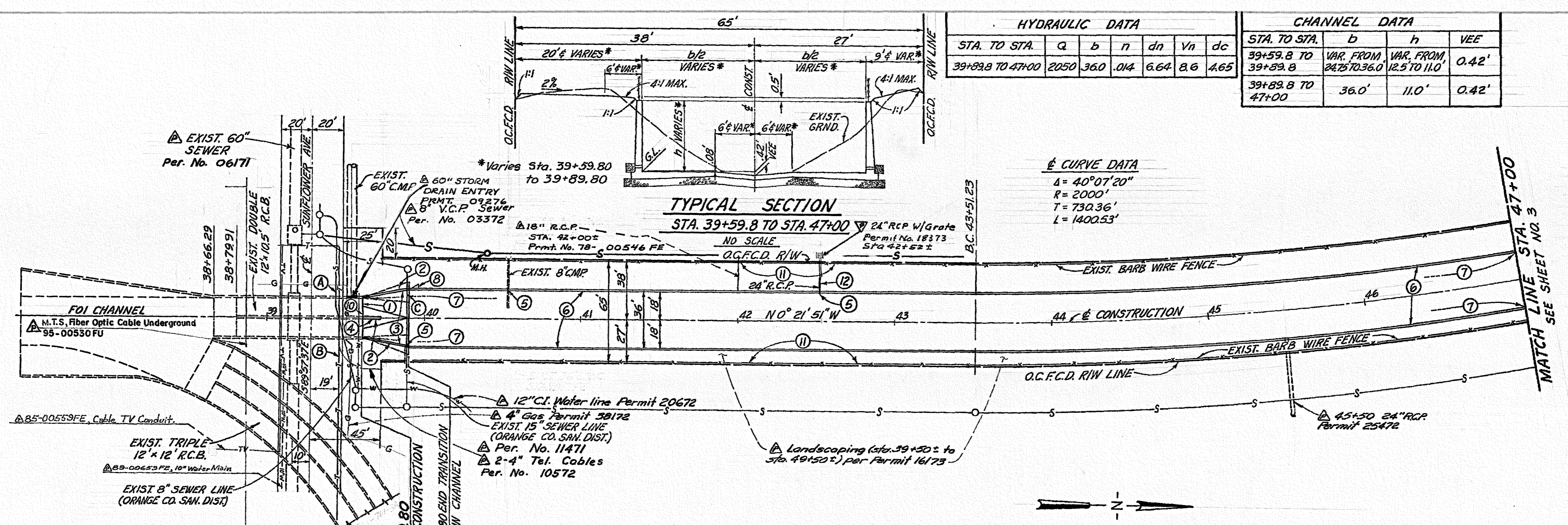
DWG. NO. F02-701-1-A

REVISIONS		
MARK	DATE	DESCRIPTION
1	7/15/09	2003-01834

3 INCHES ON ORIGINAL PLAN

LOCATION MAP

SCALE: 1" = 2000'



HYDRAULIC DATA							CHANNEL DATA			
STA. TO STA.	a	b	n	dn	Vn	dc	STA. TO STA.	b	h	VEE
39+59.8 TO 47+00	20.50	36.0	0.04	6.64	8.6	4.65	39+59.8 TO 39+89.8	VAR. FROM 24.75 TO 36.0	VAR. FROM 12.5 TO 11.0	0.42'
							39+89.8 TO 47+00	36.0'	11.0'	0.42'

CURVE DATA
 $\Delta = 40^{\circ}07'20''$
 $R = 2000'$
 $T = 730.36'$
 $L = 1400.53'$

TYPICAL SECTION
 STA. 39+59.8 TO STA. 47+00
 NO SCALE

CONSTRUCTION NOTES

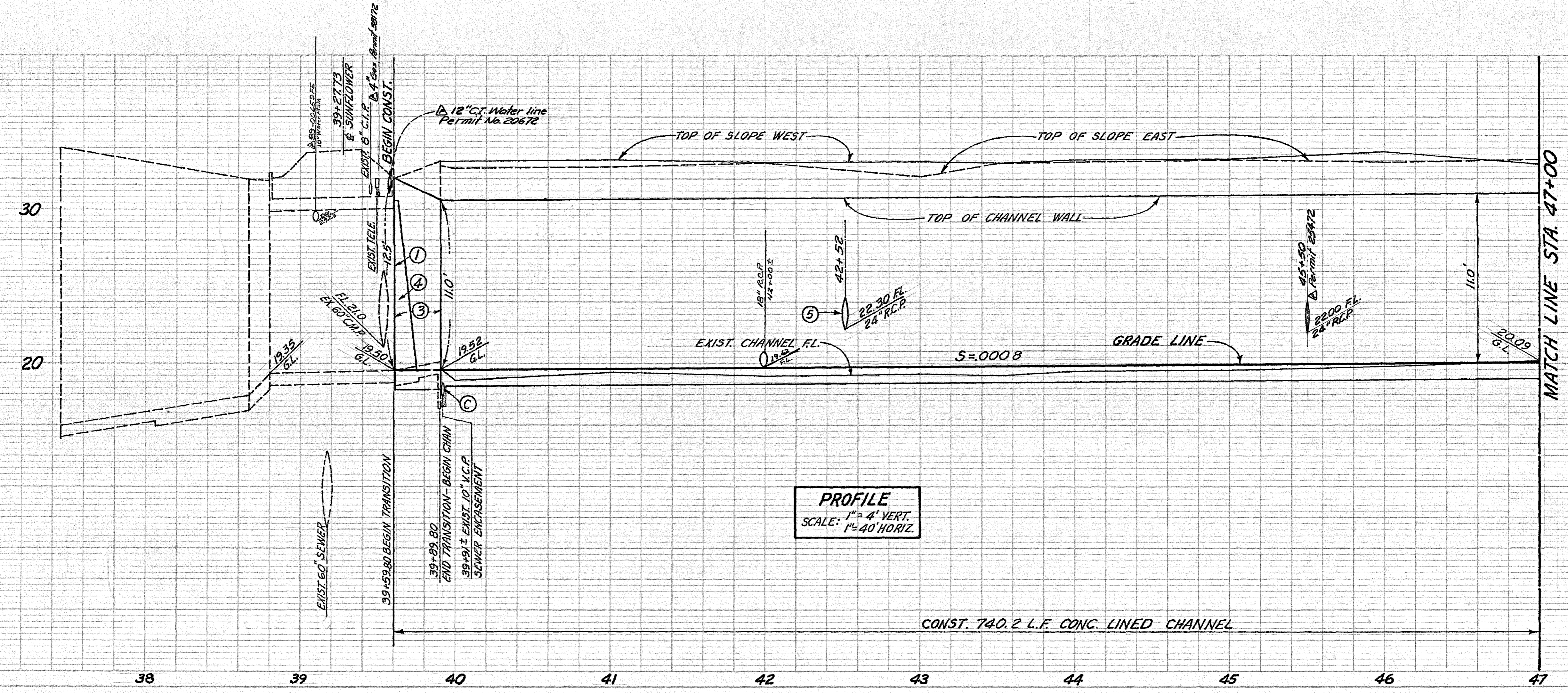
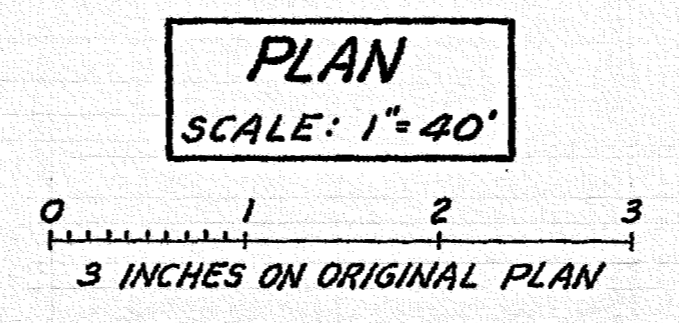
- ① JOIN EXISTING DOUBLE 12" x 10.5' R.C.B., SEE SHEET NO. 8.
- ② REMOVE EXISTING CONC. TRANSITION & DEBRIS WALL, SEE SHEET NO. 8.
- ③ CONSTRUCT CHANNEL TRANSITION, SEE SHEET NO. 8.
- ④ CONSTRUCT DEBRIS WALL, SEE SHEET NO. 8.
- ⑤ CONSTRUCT CHANNEL INLET, SEE SHEET NO. 8.
- ⑥ CONSTRUCT RECTANGULAR REINF. CONC. CHANNEL, SEE SHEET NO. 6 FOR STRUCTURAL DETAILS.
- ⑦ CONSTRUCT TYPE 1 CHAIN LINK FENCE, SEE SHEETS NO. 11 & 8.
- ⑧ CONSTRUCT 4' WIDE CHAIN LINK GATE, SEE DETAIL ON SHEETS NO. 11 & 8.
- ⑨ PROTECT IN PLACE EXIST. CHAIN LINK FENCE AND GATES. SEE SHEET NO. 8.
- ⑩ PROTECT IN PLACE EXISTING FENCE, SEE SHEET NO. 8.
- ⑪ REMOVE EXIST. BARB WIRE FENCE
- ⑫ CONST. 8 L.F. R.C.P. CLASS II, 2000 D STUB, SLOPE = .02. SEAL OPEN END WITH 8" BRICK AND MORTAR.

UTILITY NOTES

- Ⓐ PROTECT IN PLACE EXISTING 8" C.I.P.
- Ⓑ PROTECT IN PLACE EXISTING TELEPHONE CABLE
- Ⓒ PROTECT IN PLACE EXISTING 10" V.C.P. TO BE ENCASED WITH CHANNEL SLAB, SEE SHEET NO. 8.

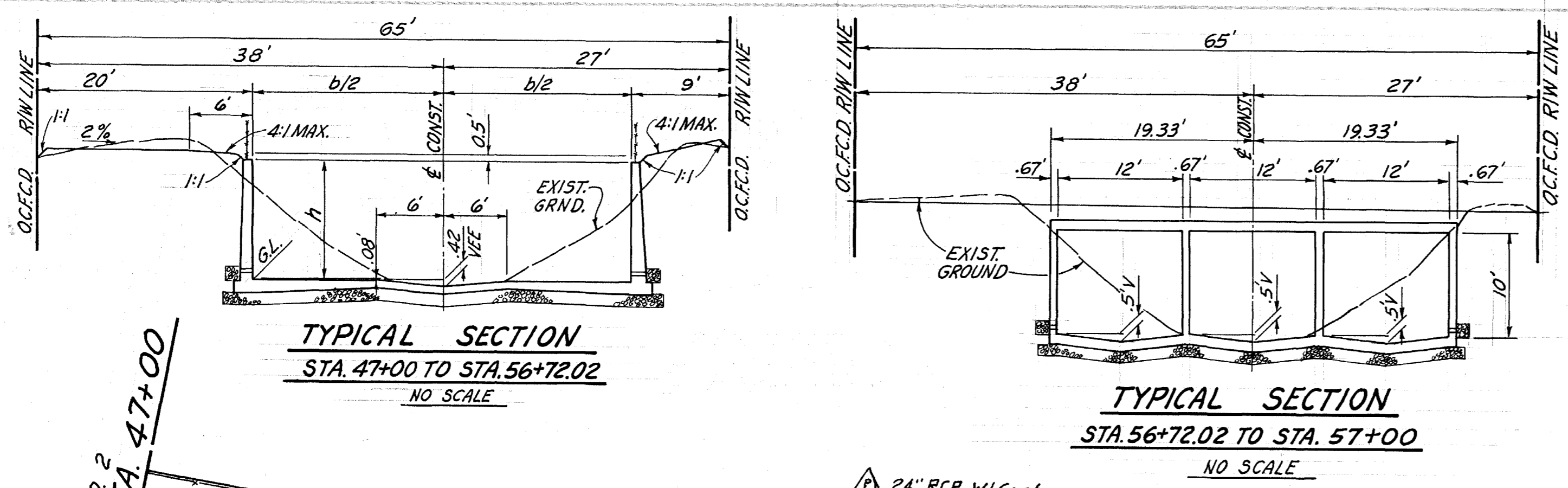
TRANSVERSE CONSTRUCTION JOINTS SEE DET. SHT. 6

1. AT STA. 39+59.80, USE CONSTRUCTION JOINT I.
2. AT AND BETWEEN STA. 39+89.80 & STA. 47+00 USE CONST. JOINT II.



DATUM = Q.C.F.C.D. = O.C.S. ADJUSTED 1957
 BENCH MARK NO. F2-2 ELEV. 34.70
 A SPIKE IN RR #599104E, ON SOUTH SIDE OF SUNFLOWER AVE., APPROX. 100' EAST OF EXISTING FO2 R.C.B. AND 700' EAST OF BRISTOL STREET.

9-76 PERMIT 09276 8-34 85-00559FE 4-35 83-00559FE	
PRELIMINARY REVISION CODE	
Disregard Prints Bearing Earlier Codes	
REVISIONS	
MARK	DATE DESCRIPTION
△	8-72 Per. Nos. 06171, 11471, 03372, 10572
△	9-72 Permit #20672
△	2-73 Permits 25472, 38172
△	1-74 As Built
△	3-74 No. 18373
△	10-78 Permt 78-00546 FE
DESIGNED: J.G.E.	
DRAWN: G.E.V. CHECKED: R.E.M.	
SUBMITTED: [Signature]	
SCALE AS SHOWN	
DATE MAR. 1972	
DWG. NO. F02-701-1-A	

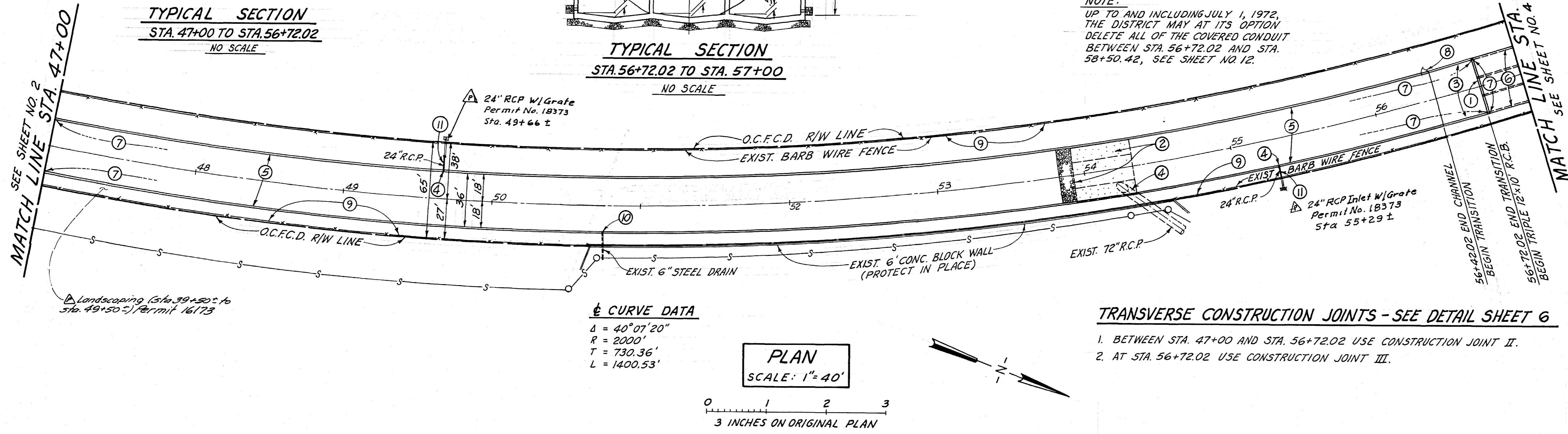


CHANNEL DATA			
STA. TO STA.	b	h	VEE
47+00.00 TO 47+15.00	36.0'	VARIES 11.0 TO 10.5'	0.42'
47+15.00 TO 56+42.02	36.0'	10.5'	0.42'
56+42.02 TO 56+72.02	VARIES 36.0 TO 37.33	VARIES 10.5 TO 12.54	0.42'
56+72.02 TO 57+00.00	TRIPLE 12' (W) x 10' (H) R.C.B.		0.50'

HYDRAULIC DATA							
STA. TO STA.	Q	b	n	dn	Vn	dc	
47+00.00 56+52.02	2050	36'	.014	6.64	8.6	4.65	
56+52.02 57+00.00	2050	TRIPLE 12' (W) x 10' (H) R.C.B.	.014	8.26	6.89	4.65	

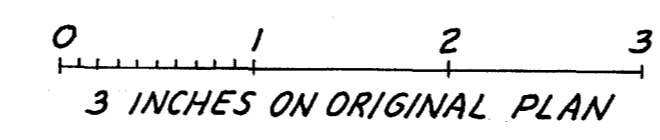
NOTE:
UP TO AND INCLUDING JULY 1, 1972, THE DISTRICT MAY AT ITS OPTION DELETE ALL OF THE COVERED CONDUIT BETWEEN STA. 56+72.02 AND STA. 58+50.42, SEE SHEET NO. 12.

- CONSTRUCTION NOTES**
- JOIN PROPOSED TRIPLE 12'x10' R.C.B., SEE SHEET NO. 9.
 - REMOVE EXISTING CONC. CHANNEL AND RIP-RAP.
 - CONSTRUCT CHANNEL TRANSITION, SEE SHEET NO. 9.
 - CONSTRUCT CHANNEL INLET, SEE SHEET NO. 8.
 - CONSTRUCT RECTANGULAR REINF. CONCRETE CHANNEL, SEE SHEET NO. 6 FOR STRUCTURAL DETAILS.
 - CONSTRUCT TRIPLE 12' (W) x 10' (H) R.C.B., SEE SHEET NO. 7 FOR STRUCTURAL DETAILS.
 - CONSTRUCT TYPE I CHAIN LINK FENCE, SEE SHTS. NO. 11 & 9.
 - CONSTRUCT 4' WIDE CHAIN LINK GATE, SEE SHEETS NO. 11 & 9.
 - REMOVE EXIST. BARB WIRE FENCE.
 - REMOVE INTERFERING PORTION OF EXIST. 6" STEEL DRAIN PIPE.
 - CONST. 8 L.F. R.C.P. CLASS II, 2000 D STUB, S=0.4. SEAL OPEN END WITH 8" BRICK & MORTAR.



± CURVE DATA
 $\Delta = 40^{\circ}07'20''$
 $R = 2000'$
 $T = 730.36'$
 $L = 1400.53'$

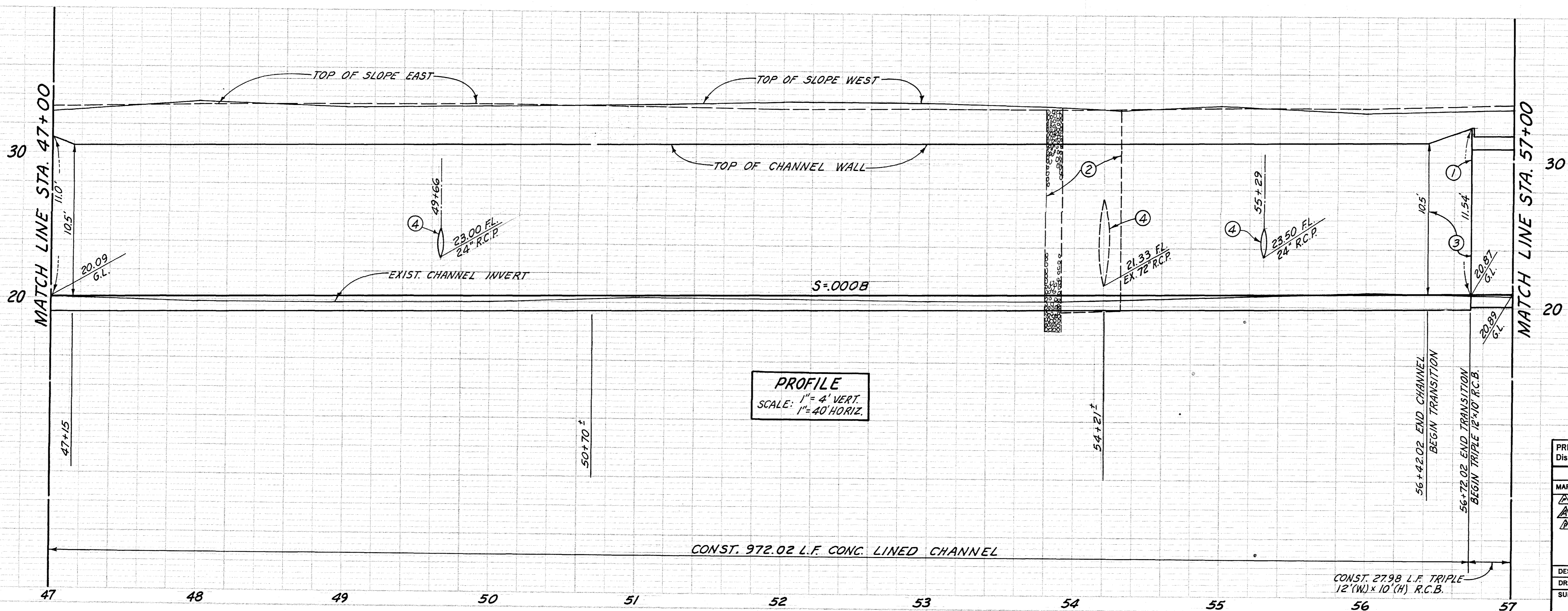
PLAN
SCALE: 1" = 40'



TRANSVERSE CONSTRUCTION JOINTS - SEE DETAIL SHEET 6

- BETWEEN STA. 47+00 AND STA. 56+72.02 USE CONSTRUCTION JOINT II.
- AT STA. 56+72.02 USE CONSTRUCTION JOINT III.

3



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

DATUM: O.C.F.C.D. "O.C.S. ADJUSTED 1957
 BENCH MARK NO. F2-2 ELEV. 34.70
 A SPIKE IN RR # 599104E, ON SOUTH SIDE OF SUNFLOWER AVE., APPROX. 100' EAST OF EXISTING F02 R.C.B. AND 100' EAST OF BRISTOL STREET.
 BENCH MARK NO. F2-8 ELEV. 34.87
 THE N.E. CORNER OF SQUARE MANHOLE RIM ON THE NORTH SIDE OF ALTON AVE. APPROX. 50' WEST OF F02 CHANNEL.

PRELIMINARY REVISION CODE		Disregard Prints Bearing Earlier Codes	
REVISIONS			
MARK	DATE	DESCRIPTION	
▲	10-75	Per. #14173	
▲	1-74	As Built	
▲	3-74	No. 18373	
DESIGNED		U.G.F.	
DRAWN		G.E.V.	
CHECKED		R.E.M.	
SUBMITTED		V.T.N. ORANGE CO.	
SCALE		DATE	
AS SHOWN		MAR. 1972	
DWG. NO.		F02-701-1-A	

4

CHANNEL DATA		
STA. TO STA.	VEE	
57+00.00 TO 61+73.19	TRIPLE 12" (W) x 10" (H) R.C.B.	0.50'

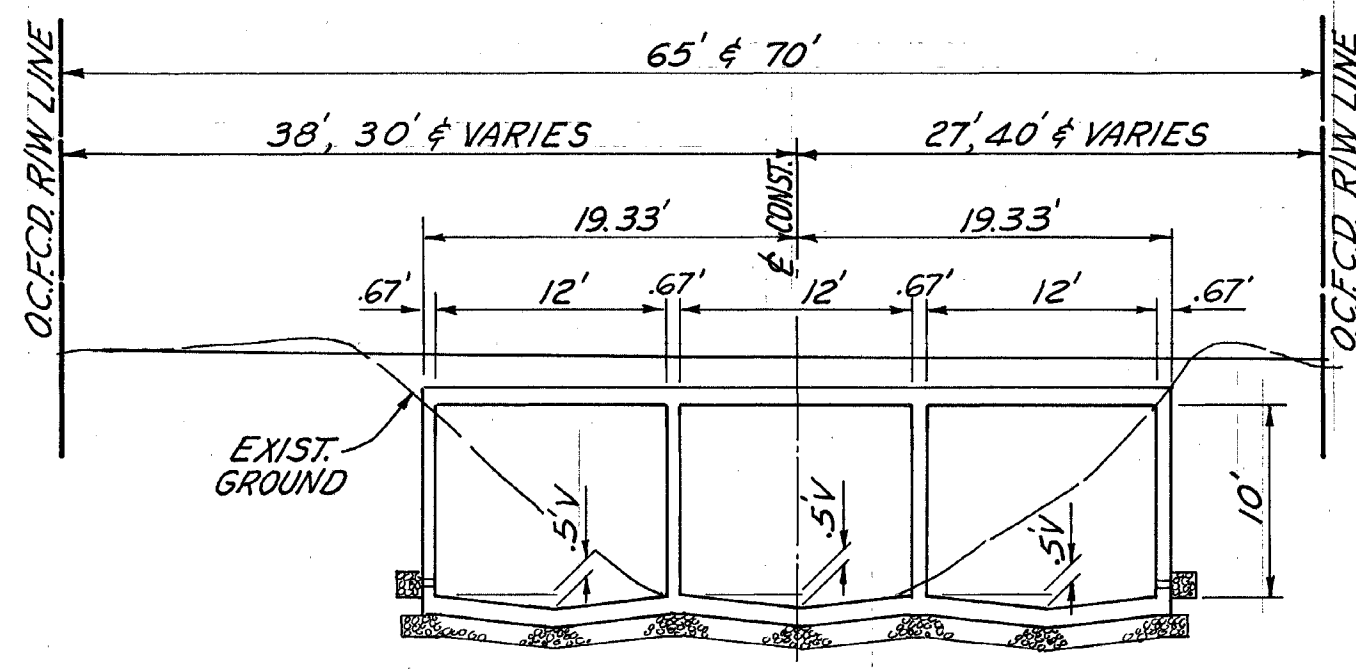
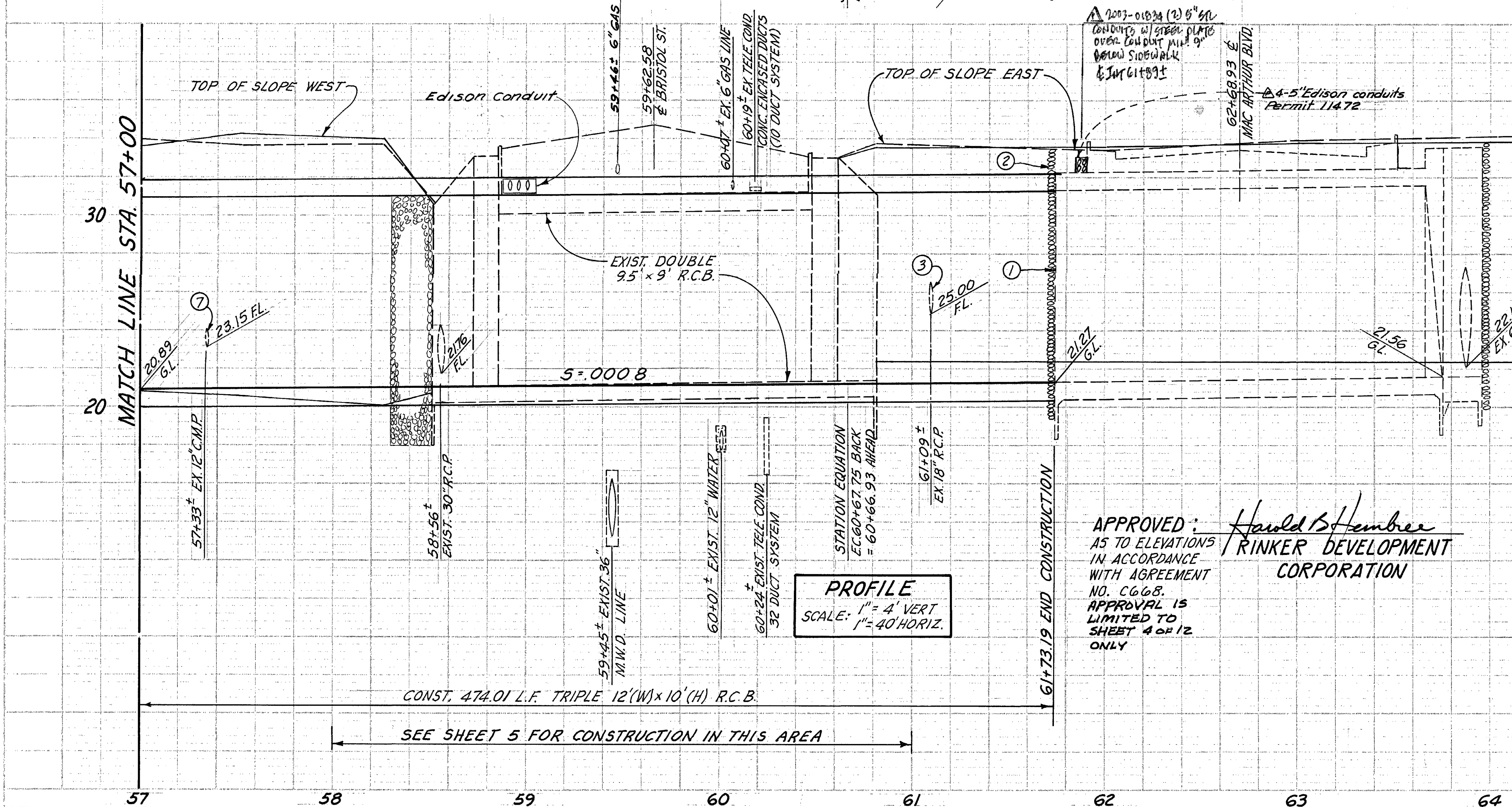
HYDRAULIC DATA							
STA. TO STA.	Q	b	n	dn	Vn	dc	
57+0000	61+73.19	2050	TRIPLE 12" R.C.B.	0.14	8.26	6.69	4.65

NOTE:
UP TO & INCLUDING JULY 1, 1972 THE DISTRICT MAY AT ITS OPTION DELETE ALL OF THE COVERED CONDUIT BETWEEN STA. 58+72.02 AND STA. 58+50.42, SEE SHEET NO. 12.

NOTE:
SEE SHEET 5 FOR CONSTRUCTION BETWEEN STA. 58+00 TO STA. 61+00.

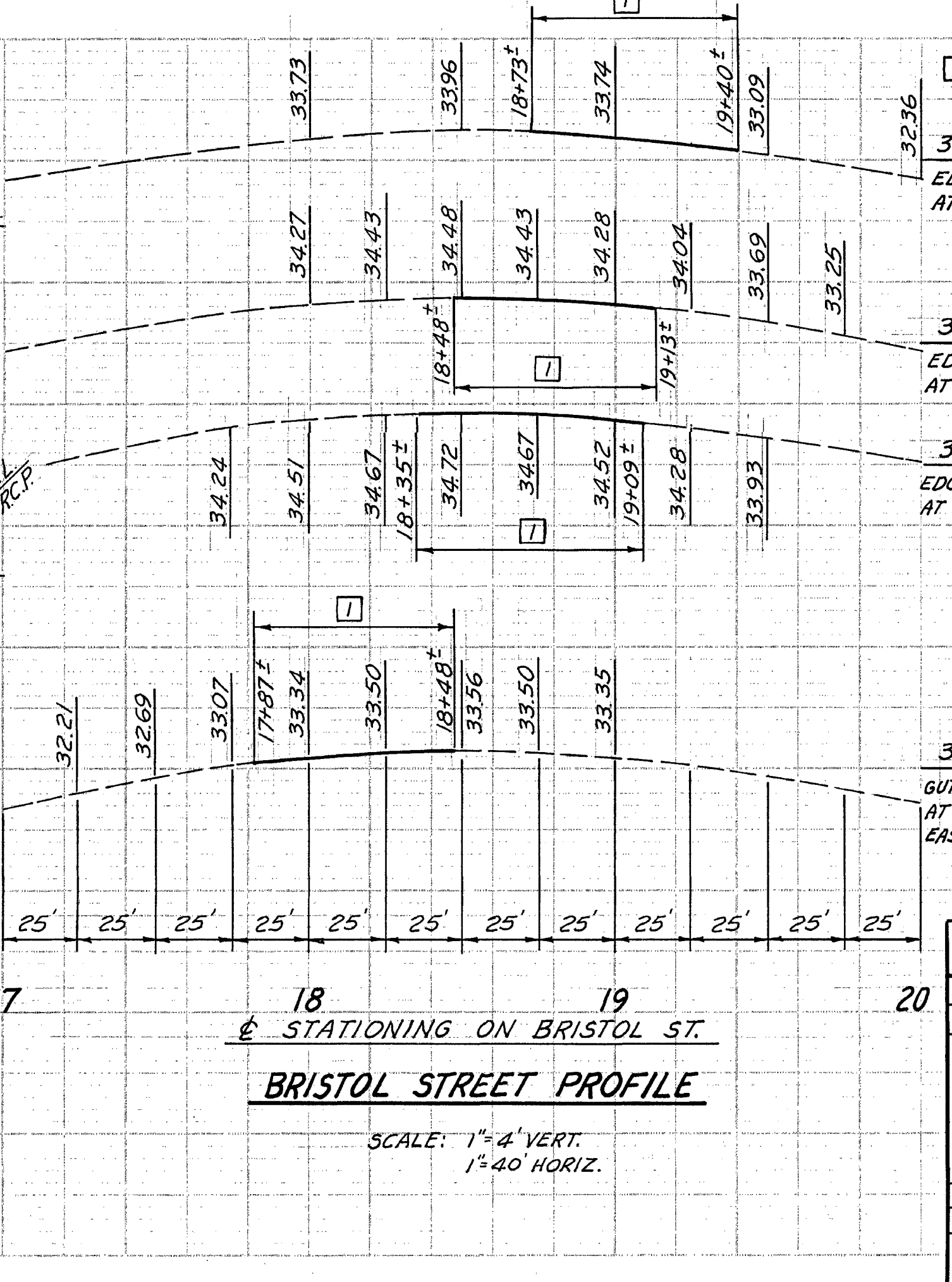
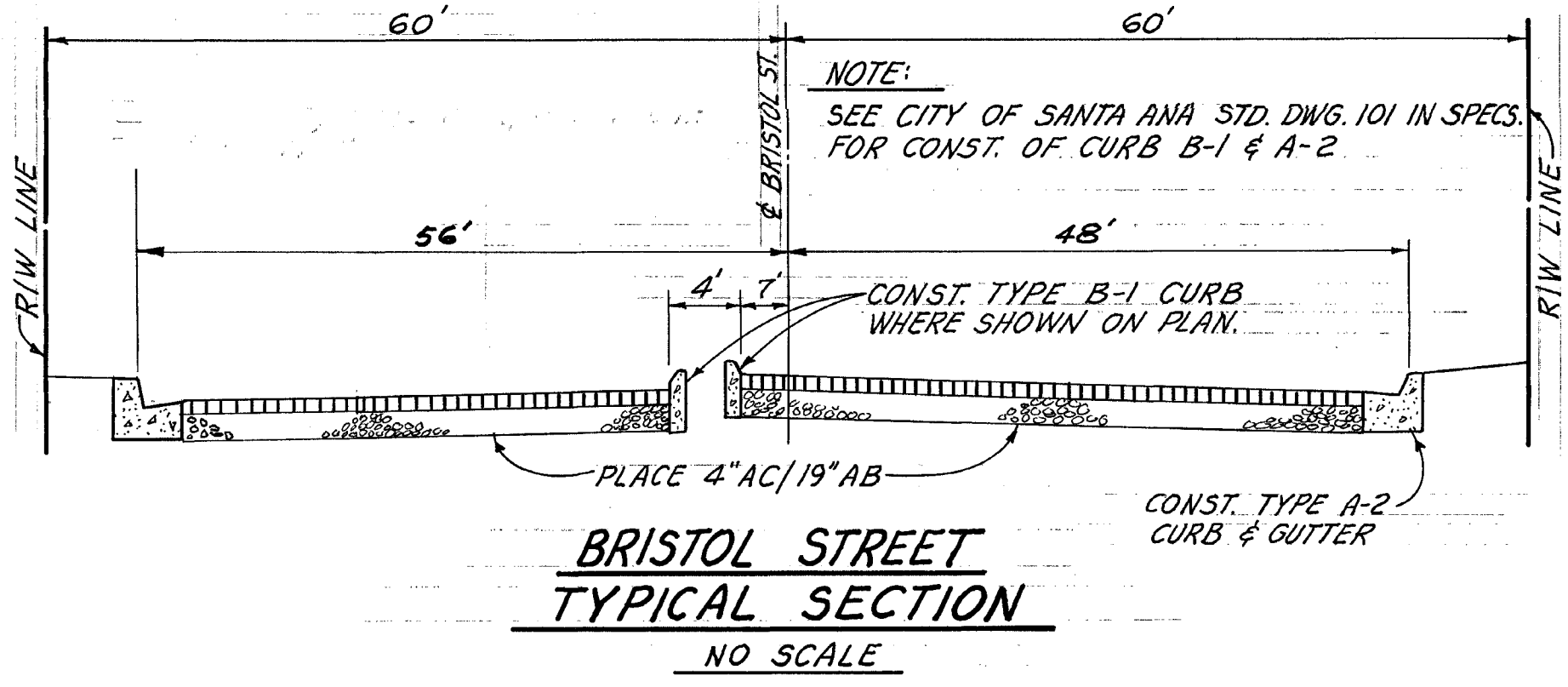
SEE SHEET NO. 3
MATCH LINE STA. 57+00

- ① N 40° 29' 12" W
- ② N 37° 29' 12" W
- ③ N 37° 59' 12" W
- ④ N 40° 29' 12" W



- CONSTRUCTION NOTES**
- ① JOIN EXISTING TRIPLE 12" x 10" R.C.B., SEE SHEET NO. 8.
 - ② REMOVE EXISTING BULKHEAD PLANKS.
 - ③ CONSTRUCT CHANNEL INLET, SEE SHEET NO. 8.
 - ④ CONSTRUCT TRIPLE 12" (W) x 10" (H) R.C.B., SEE SHEET NO. 7 FOR STRUCTURAL DETAILS.
 - ⑤ SALVAGE EX.C.L. FENCE (TO BE PICKED UP BY THE DISTRICT).
 - ⑥ REMOVE EXIST. BARB WIRE FENCE.
 - ⑦ REMOVE INTERFERING PORTION OF 12" C.M.P.

- TRANSVERSE CONSTRUCTION JOINTS - SEE DETAIL SHTS. 7 & 8**
1. BETWEEN STA. 57+00 AND STA. 61+73.19 USE R.C. BOX CULVERT CONSTRUCTION JOINT.
 2. AT STA. 61+73.19 USE CONSTRUCTION JOINT III, SEE SHEET NO. 8.



- ① APPROX. LIMIT OF R.C.B. EARTHWORK AND RECONSTRUCTION OF BRISTOL STREET IMPROVEMENTS.
- 33 EDGE OF PAVEMENT AT 31' WEST OF E
- 33 EDGE OF PAVEMENT AT WEST MEDIAN CURB
- 33 EDGE OF PAVEMENT AT EAST MEDIAN CURB
- DATUM = O.C.F.C.D. = O.C.S. ADJUSTED 1957.
BENCH MARK NO. F2-2 ELEV. 34.70
A SPIKE IN PP. #599104E, ON SOUTH SIDE OF SUNFLOWER AVE. APPROX. 100' EAST OF EXISTING FO2 R.C.B. AND 700' EAST OF BRISTOL STREET.
- 33 BENCH MARK NO. F2-8 ELEV. 34.87
THE N.E. CORNER OF SQUARE MANHOLE RIM ON THE NORTH SIDE OF ALTON AVE. EAST OF E APPROX. 50' WEST OF FO2 CHANNEL.

APPROVED: *Harold Stember*
RINKER DEVELOPMENT CORPORATION

NO. CG68.
APPROVAL IS LIMITED TO SHEET 4 OF 12 ONLY

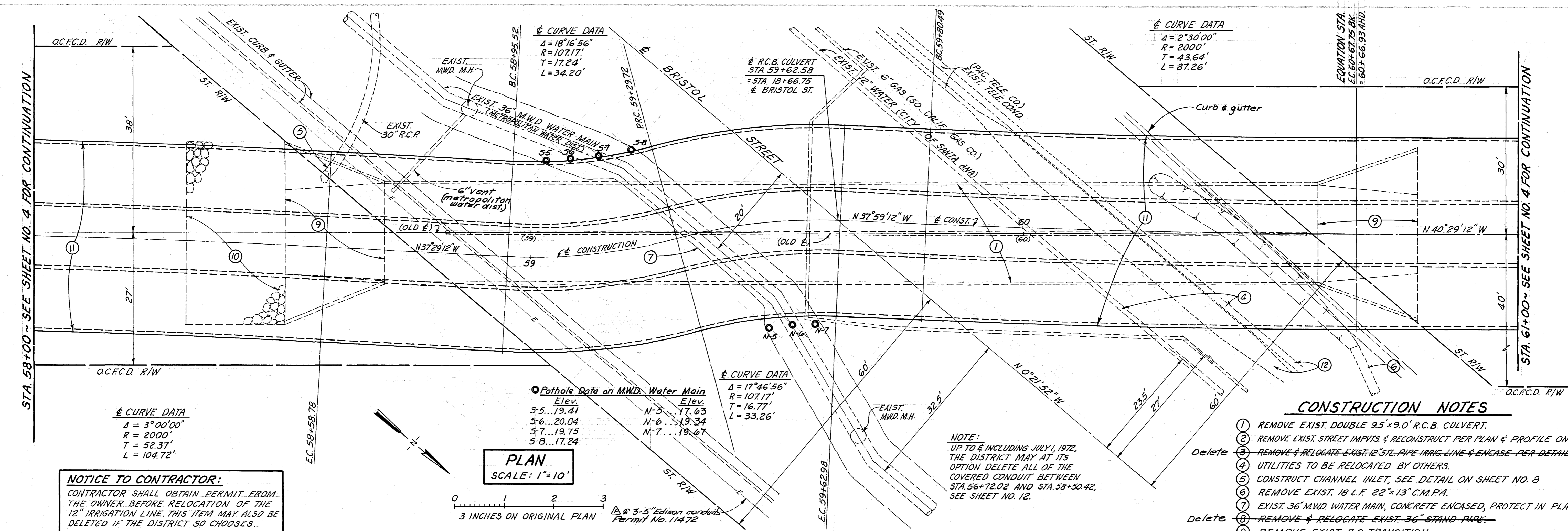
PROFILE
SCALE: 1" = 4' VERT.
1" = 40' HORIZ.

PRELIMINARY REVISION CODE		ORANGE COUNTY FLOOD CONTROL DISTRICT	
Disregard Prints Bearing Earlier Codes			
REVISIONS		SANTA ANA - GARDENS CHANNEL	
MARK	DATE	DESCRIPTION	
Δ	11-72	Permit No. 11472	
Δ	7-73	Permit No. 22871	
Δ	1-74	AS BUILT	
Δ	4/83	AS BUILT	
Δ	05-01	AS BUILT	
Δ	06-01	AS BUILT	
Δ	07-01	AS BUILT	
Δ	07-01	AS BUILT	

DESIGNED: U.S.F.
DRAWN: G.E.V. CHECKED: R.E.M.
SUBMITTED: *[Signature]* V.T.N. ORANGE CO.

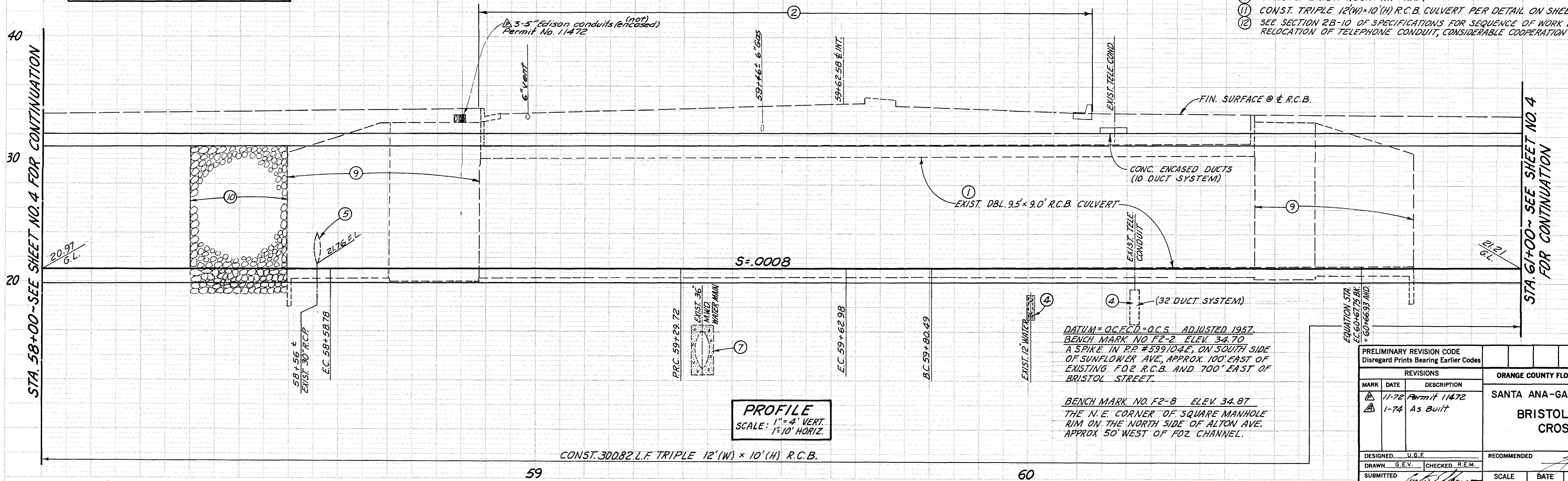
SCALE AS SHOWN DATE MAR. 1972 DWG. NO. F02-701-1-A

5

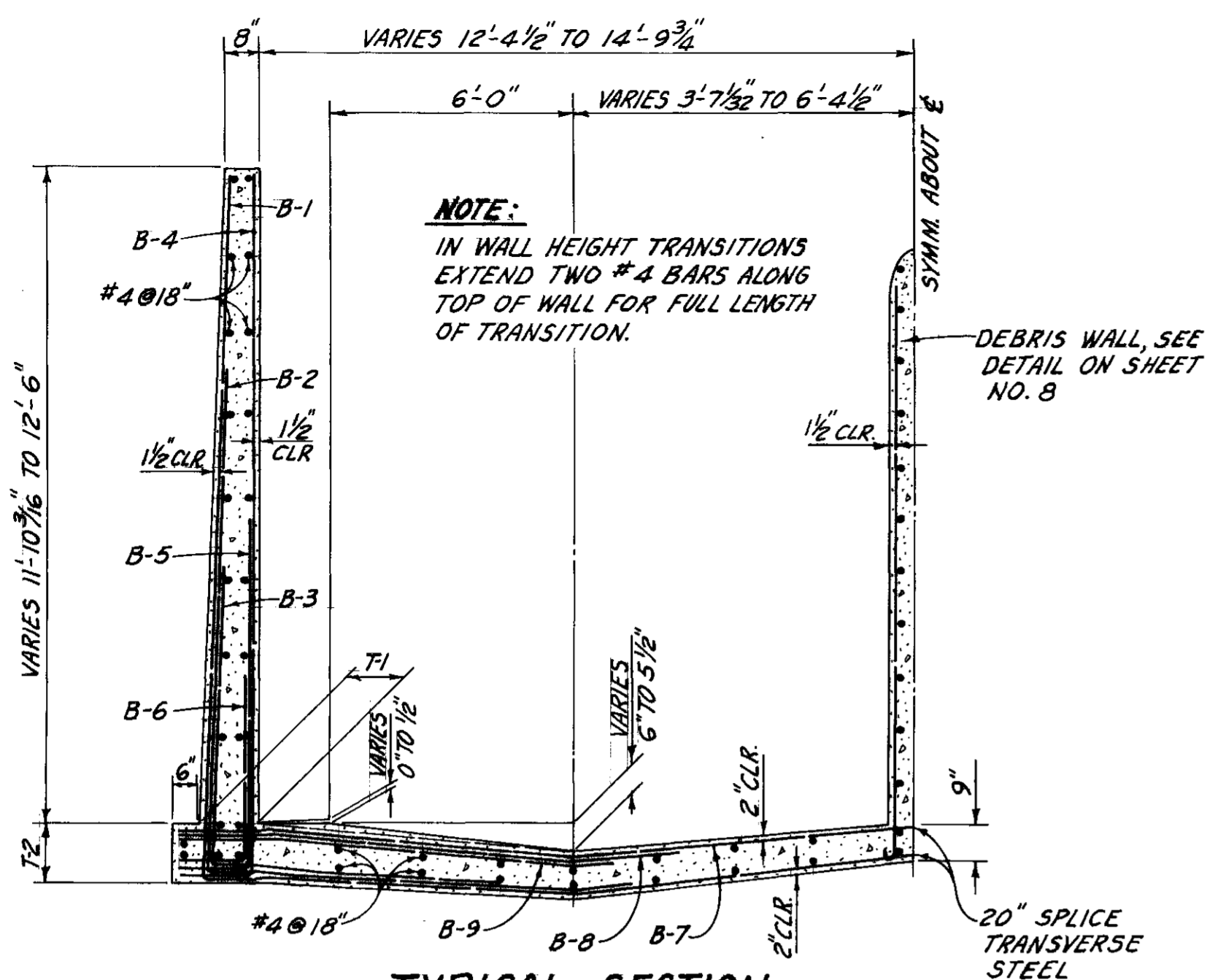


NOTICE TO CONTRACTOR:
 CONTRACTOR SHALL OBTAIN PERMIT FROM THE OWNER BEFORE RELOCATION OF THE 12" IRRIGATION LINE. THIS ITEM MAY ALSO BE DELETED IF THE DISTRICT SO CHOOSES.
 OWNER MR. JOSEPH CALLENS

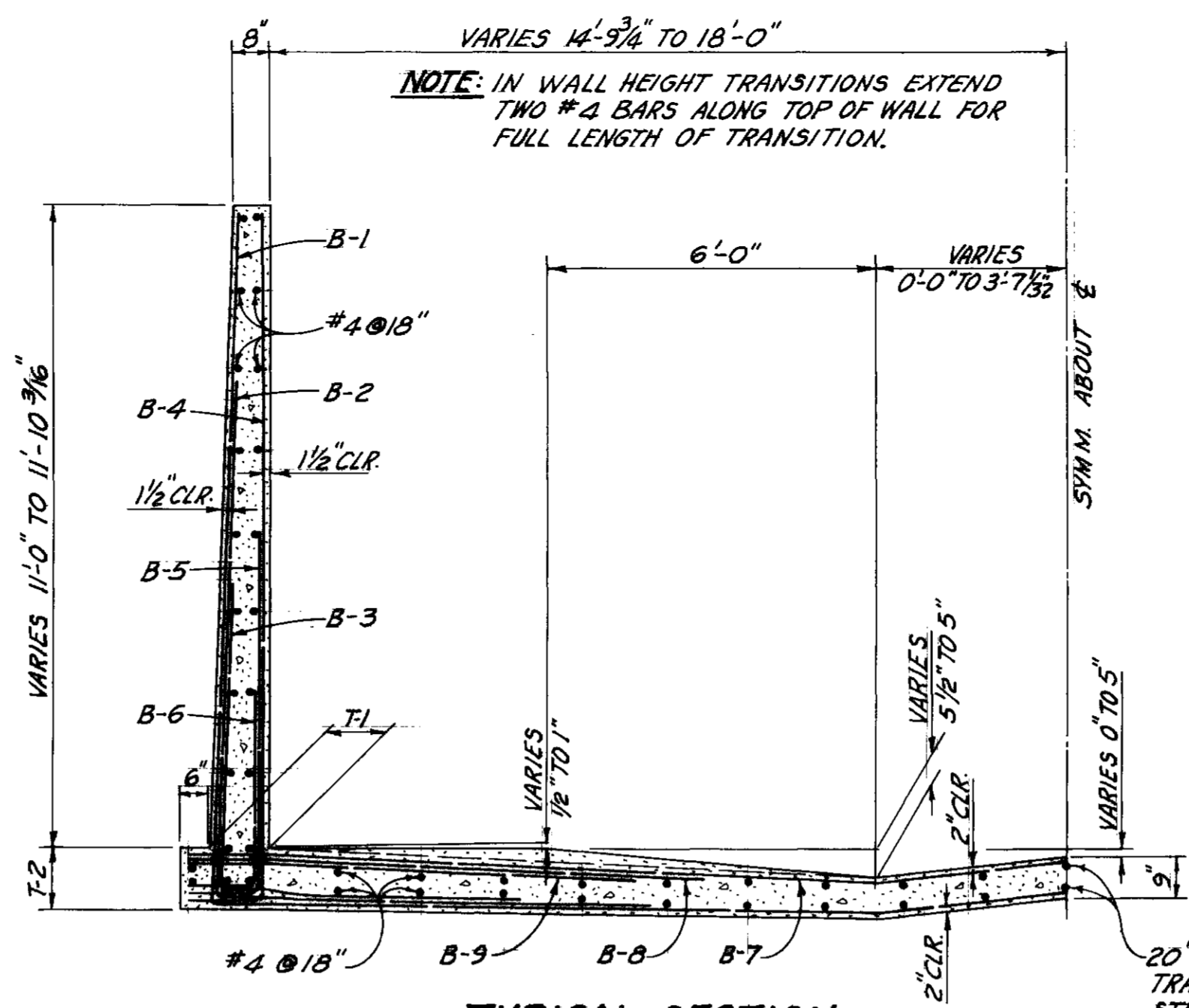
- CONSTRUCTION NOTES**
- 1 REMOVE EXIST. DOUBLE 9.5' x 9.0' R.C.B. CULVERT.
 - 2 REMOVE EXIST. STREET IMPVTS & RECONSTRUCT PER PLAN & PROFILE ON SHEET NO. 4
 - 3 REMOVE & RELOCATE EXIST. 12" STE. PIPE IRRIG. LINE & ENCASE PER DETAIL ON SHEET NO. 7
 - 4 UTILITIES TO BE RELOCATED BY OTHERS.
 - 5 CONSTRUCT CHANNEL INLET, SEE DETAIL ON SHEET NO. 8
 - 6 REMOVE EXIST. 18 L.F. 22" x 13" C.M.P.A.
 - 7 EXIST. 36" M.W.D. WATER MAIN, CONCRETE ENCASED, PROTECT IN PLACE.
 - 8 REMOVE & RELOCATE EXIST. 36" STAND PIPE.
 - 9 REMOVE EXIST. R.C. TRANSITION.
 - 10 REMOVE EXIST. ROCK RIP-RAP.
 - 11 CONST. TRIPLE 12'(W) x 10'(H) R.C.B. CULVERT PER DETAIL ON SHEET NO. 7.
 - 12 SEE SECTION 2B-10 OF SPECIFICATIONS FOR SEQUENCE OF WORK DURING RELOCATION OF TELEPHONE CONDUIT, CONSIDERABLE COOPERATION IS NECESSARY.



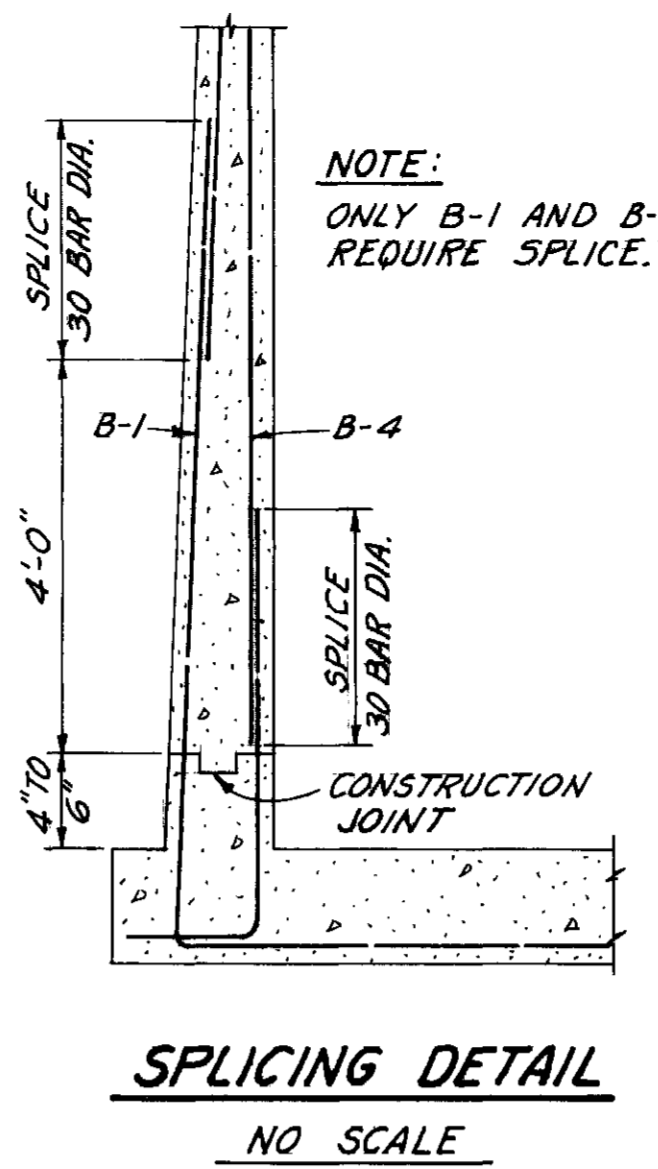
PRELIMINARY REVISION CODE		ORANGE COUNTY FLOOD CONTROL DISTRICT	
Disregard Prints Bearing Earlier Codes		SANTA ANA-GARDENS CHANNEL	
REVISIONS		BRISTOL STREET CROSSING	
MARK	DATE	DESCRIPTION	
Δ	11-72	Permit 11472	
Δ	1-74	As Built	
DESIGNED U.G.F.		RECOMMENDED	
DRAWN G.E.V.		CHECKED R.E.M.	
SUBMITTED		SCALE AS SHOWN	DATE MAR. 1972
		DWG. NO. F02-701-1-A	



TYPICAL SECTION
STA. 39+59.8 TO STA. 39+72.8
 SCALE: 3/8"=1'-0"

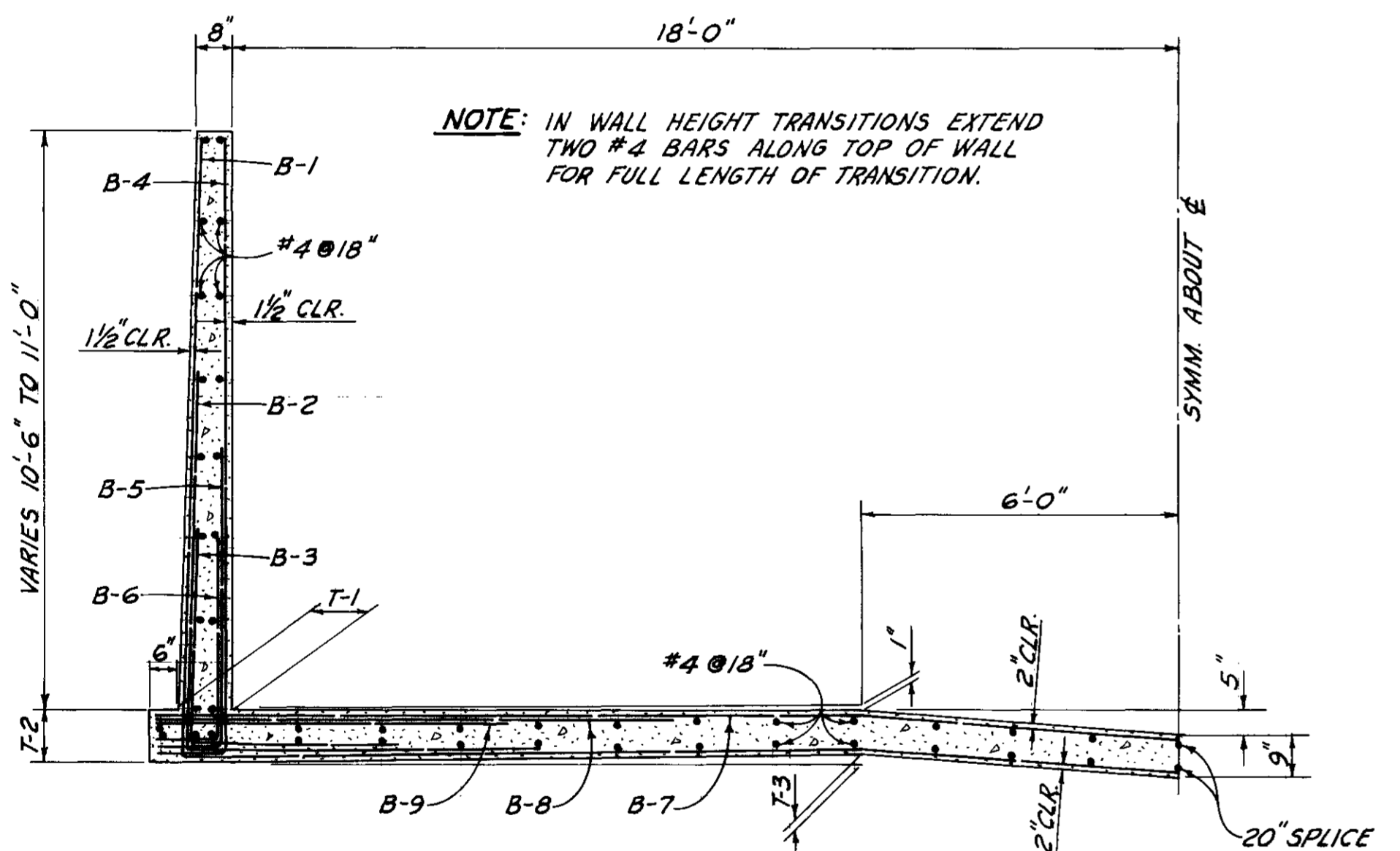


TYPICAL SECTION
STA. 39+72.8 TO STA. 39+89.8
 SCALE: 3/8"=1'-0"

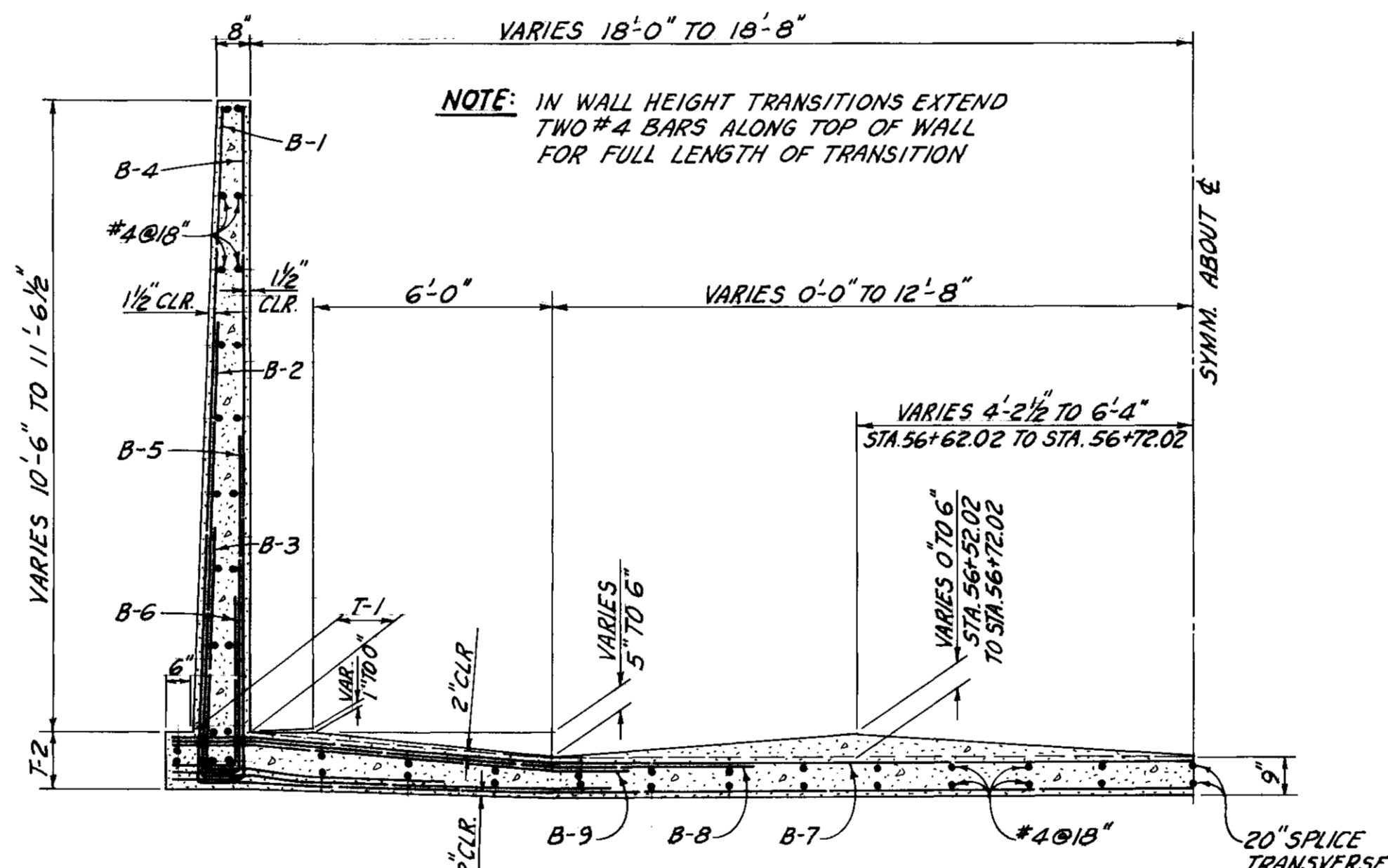


SPLICING DETAIL
 NO SCALE

	STRUCTURAL DATA											
	REINFORCING STEEL									THICKNESS		
	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9	T-1	T-2	T-3
STA. 39+59.8 TO STA. 39+72.8	#4@10"	#6@10"	#7@10"	#4@13"	#5@13"	#5@13"	#5@13"	#2@13"	#6@13"	1'-2"	1'-2"	—
HORIZONTAL LENGTH	VARIES 15'-0" TO 17'-5"	8'-3"	5'-6"	1'-4"	1'-4"	1'-4"	VARIES 15'-6" TO 17'-11"	9'-7"	8'-3"			
VERTICAL LENGTH	VARIES 12'-8" TO 13'-4"	9'-8"	5'-10"	VARIES 12'-9" TO 13'-4"	6'-10"	3'-9"	—	—	—			
STA. 39+72.8 TO STA. 39+89.8	#4@10"	#6@10"	#7@10"	#4@13"	#5@13"	#5@13"	#5@13"	#4@13"	#6@13"	1'-2"	1'-2"	—
HORIZONTAL LENGTH	VARIES 17'-5" TO 20'-8"	8'-3"	5'-6"	1'-4"	1'-4"	1'-4"	VARIES 15'-6" TO 21'-2"	9'-7"	8'-3"			
VERTICAL LENGTH	VARIES 11'-10" TO 12'-8"	9'-8"	5'-10"	VARIES 11'-10" TO 12'-8"	6'-10"	3'-9"	—	—	—			
STA. 39+89.8 TO STA. 47+00	#5@11"	#6@11"	#6@11"	#4@17"	#4@17"	#6@17"	#4@14"	#5@14"	#5@14"	1'-0"	1'-1"	2"
HORIZONTAL LENGTH	20'-6"	6'-9"	4'-1"	1'-3"	1'-3"	1'-3"	21'-0"	9'-11"	6'-9"			
VERTICAL LENGTH	11'-9"	7'-3"	4'-1"	11'-9"	5'-10"	4'-4"	—	—	—			
STA. 47+00 TO STA. 47+15	#5@11"	#6@11"	#6@11"	#4@17"	#4@17"	#6@17"	#4@14"	#5@14"	#5@14"	1'-0"	1'-1"	2"
HORIZONTAL LENGTH	20'-6"	6'-9"	4'-1"	1'-3"	1'-3"	1'-3"	21'-0"	9'-11"	6'-9"			
VERTICAL LENGTH	VARIES 11'-3" TO 11'-9"	7'-3"	4'-1"	VARIES 11'-3" TO 11'-9"	5'-10"	4'-4"	—	—	—			
STA. 47+15 TO STA. 56+42.02	#5@9"	#5@9"	#5@9"	#4@13"	#5@13"	#5@13"	#4@15"	#5@15"	#5@15"	1'-0"	1'-0"	2"
HORIZONTAL LENGTH	20'-6"	5'-9"	3'-7"	1'-2"	1'-2"	1'-2"	21'-0"	9'-7"	6'-5"			
VERTICAL LENGTH	11'-2"	6'-0"	3'-6"	11'-2"	5'-8"	3'-2"	—	—	—			
STA. 56+42.02 TO STA. 56+72.02	#5@12"	#7@12"	#7@12"	#4@13"	#5@13"	#5@13"	#4@15"	#5@15"	#7@15"	1'-2"	1'-2"	—
HORIZONTAL LENGTH	VARIES 20'-8" TO 21'-4"	8'-2"	4'-10"	1'-4"	1'-4"	1'-4"	VARIES 21'-2" TO 21'-10"	11'-6"	9'-0"			
VERTICAL LENGTH	VARIES 11'-4" TO 12'-5"	9'-2"	5'-0"	VARIES 11'-4" TO 12'-5"	6'-10"	3'-9"	—	—	—			



TYPICAL SECTION
STA. 39+89.8 TO STA. 56+42.02
 SCALE: 3/8"=1'-0"



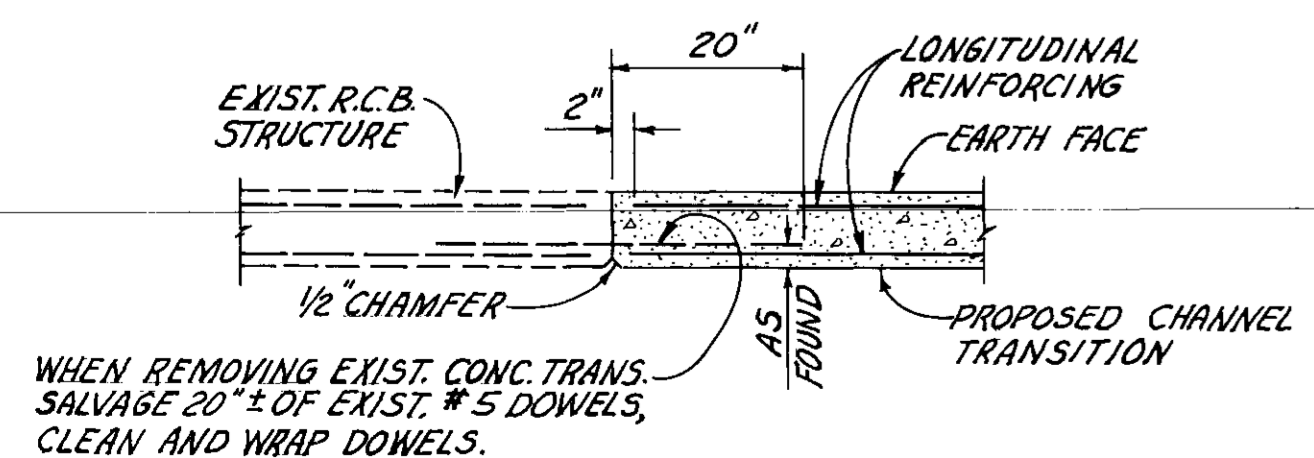
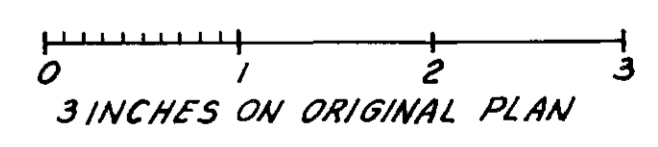
TYPICAL SECTION
STA. 56+42.02 TO STA. 56+72.02
 SCALE: 3/8"=1'-0"

CONSTRUCTION NOTES

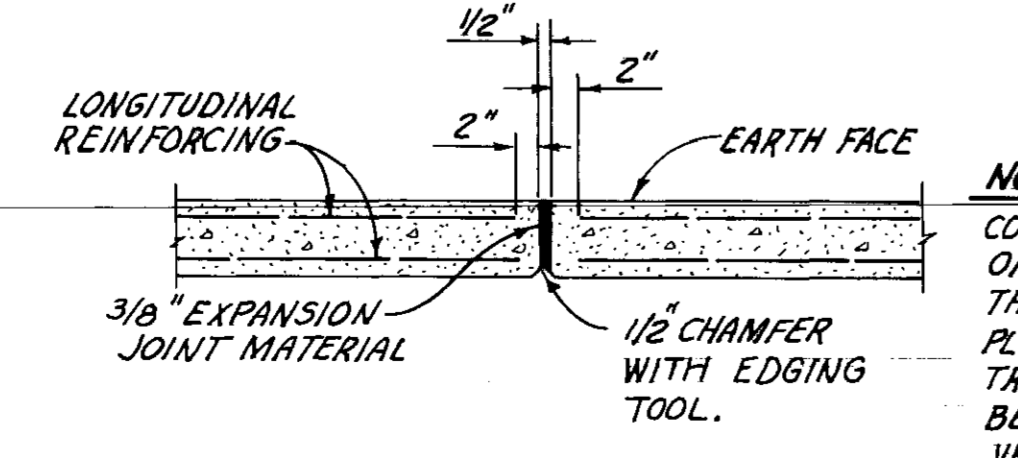
- SPLICES IN REINFORCING STEEL SHALL BE 30 BAR DIAMETERS UNLESS OTHERWISE SHOWN
- ALL EXPOSED EDGES SHALL HAVE A 3/4" CHAMFER.
- MIN. WAITING PERIOD BETWEEN ADJACENT R.C. INVERT POURS SHALL BE 4 HOURS.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE PLACED AT ALL GRADE BREAKS, CHANGES IN BASE WIDTH AND CHANGES IN WALL HEIGHT.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE IN THE SAME PLANE ACROSS ENTIRE STRUCTURE.
- BUNDLE REINFORCING BARS TO CLEAR WEEPHOLES BY 1/2".

DESIGN CRITERIA FOR ALL REINFORCED CONCRETE:

- f_c = 3,000 PSI
- f_c = 1,200 PSI
- f_s = 20,000 PSI
- v = 90 PSI SHEAR
- u = 300 PSI BOND

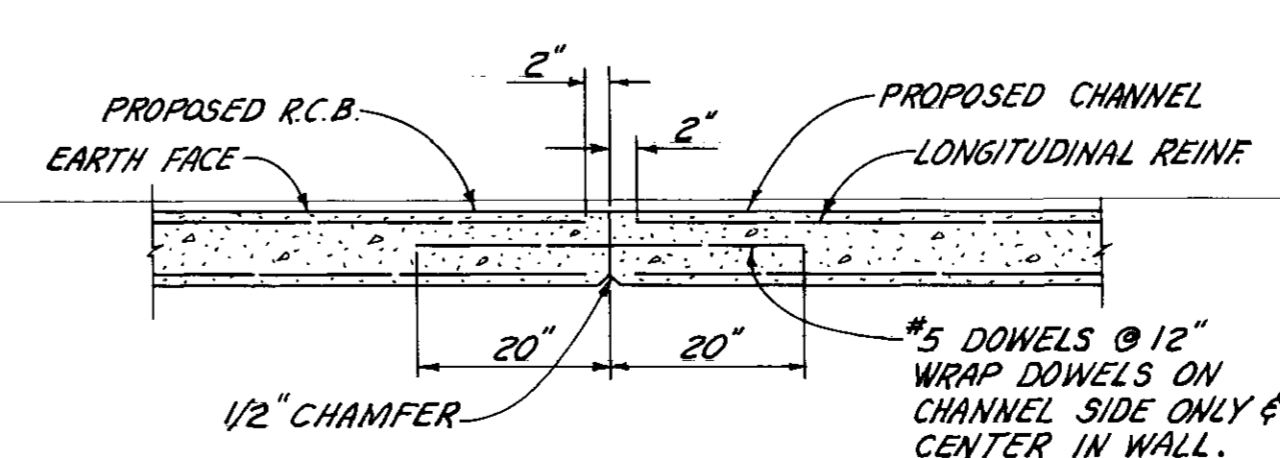


CONSTRUCTION JOINT I DETAIL
 NO SCALE



CONSTRUCTION JOINT II DETAIL
 NO SCALE

NOTE:
 CONST. JOINT II TO BE AT INTERVALS OF NOT LESS THAN 10' NOR MORE THAN 50'. JOINT TO BE IN THE SAME PLANE ACROSS ENTIRE STRUCTURE. TRANSVERSE CONST. JOINTS SHALL NOT BE PLACED WITHIN 30' OF INLET OPENING. ONLY VERTICAL WALL JOINTS SHALL BE PAINTED WITH A TACK COAT OF ASPHALT PAINT.

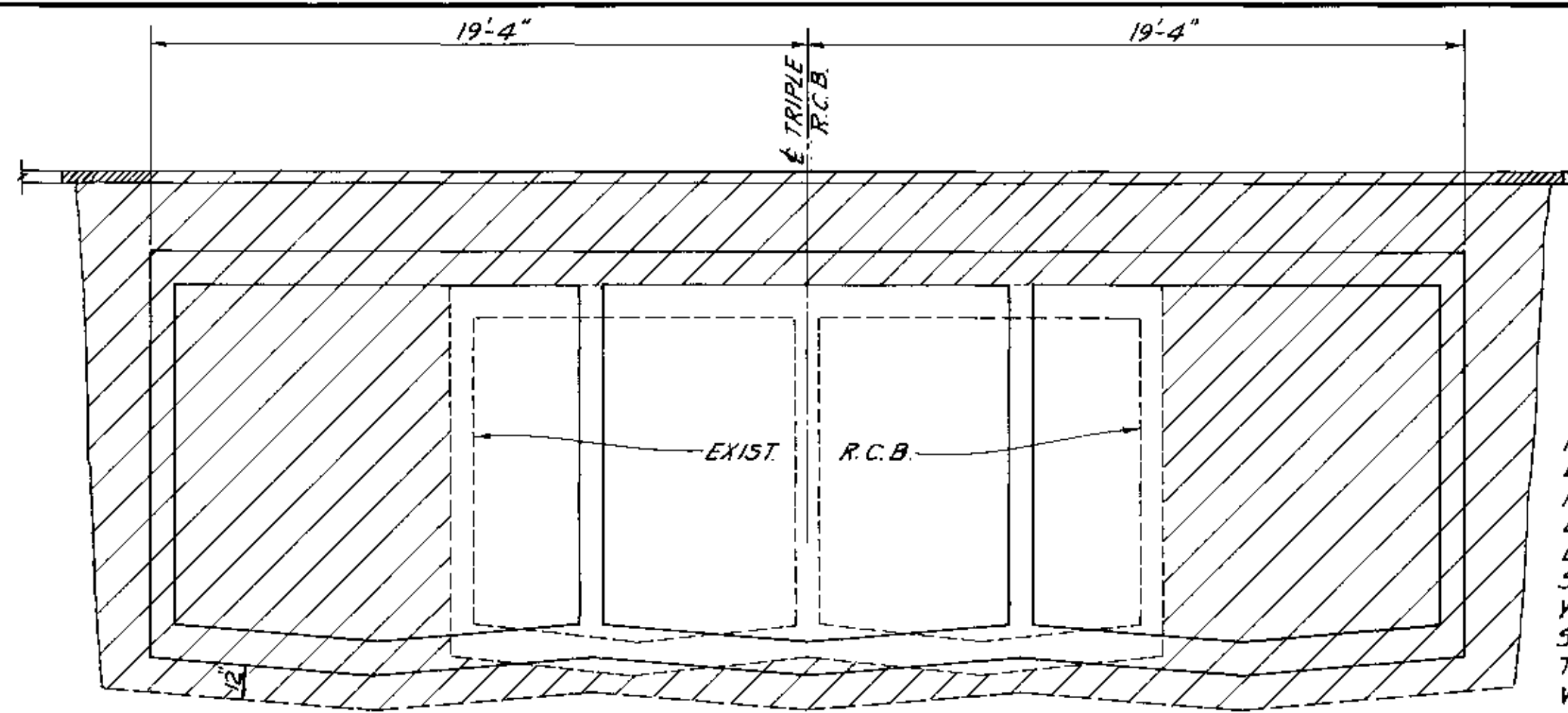


CONSTRUCTION JOINT III DETAIL
 NO SCALE

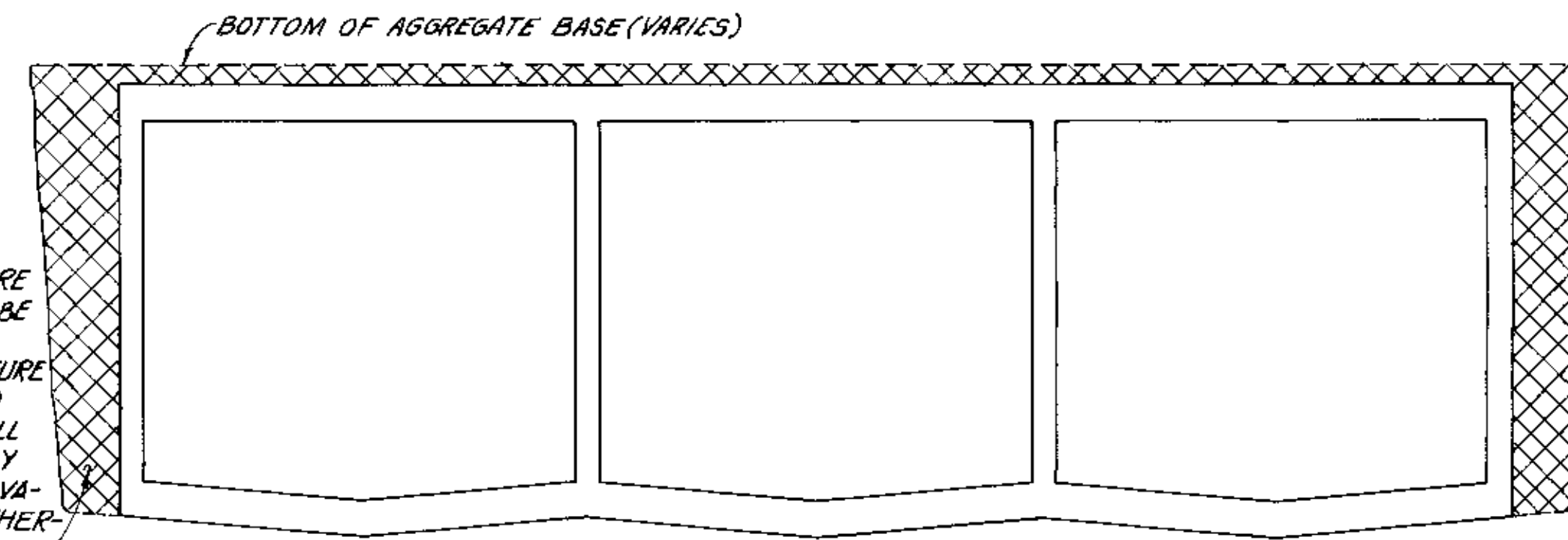
PRELIMINARY REVISION CODE Disregard Prints Bearing Earlier Codes			ORANGE COUNTY FLOOD CONTROL DISTRICT		
REVISIONS			SANTA ANA - GARDENS CHANNEL		
MARK	DATE	DESCRIPTION	STRUCTURAL DETAILS		
Δ	1-74	As Built			
DESIGNED	U.G.F.	RECOMMENDED	[Signature]		
DRAWN	G.E.V.	CHECKED	R.E.M.		
SUBMITTED	V.T.N. ORANGE CO.		SCALE	DATE	DWG. NO.
	AS SHOWN	MAR. 1972	F02-701-1-4		

R.C. BOX CULVERT GENERAL NOTES

1. ALL EXPOSED EDGES SHALL HAVE 3/4" CHAMFER.
2. ALL REINF. BARS SHALL BE PLACED SYMMETRICAL ABOUT \bar{x} OF CULVERT.
3. REINFORCEMENT EMBEDMENT IS 1 1/2" CLEAR, EXCEPT AS NOTED.
4. SPLICES IN REINFORCING SHALL BE 30 BAR DIAMETERS UNLESS OTHERWISE SHOWN.
5. WHEN THE SIDE WALLS & DECK ARE POURED MONOLITHICALLY, THE SIDE WALLS SHALL BE POURED COMPLETELY FIRST. AFTER A SUITABLE TIME, TO BE DETERMINED BY THE ENGINEER (30 MINUTES MINIMUM), THE DECK MAY BE POURED.
6. BUNDLE REINF. BARS TO CLEAR WEEPHOLES BY 1 1/2".

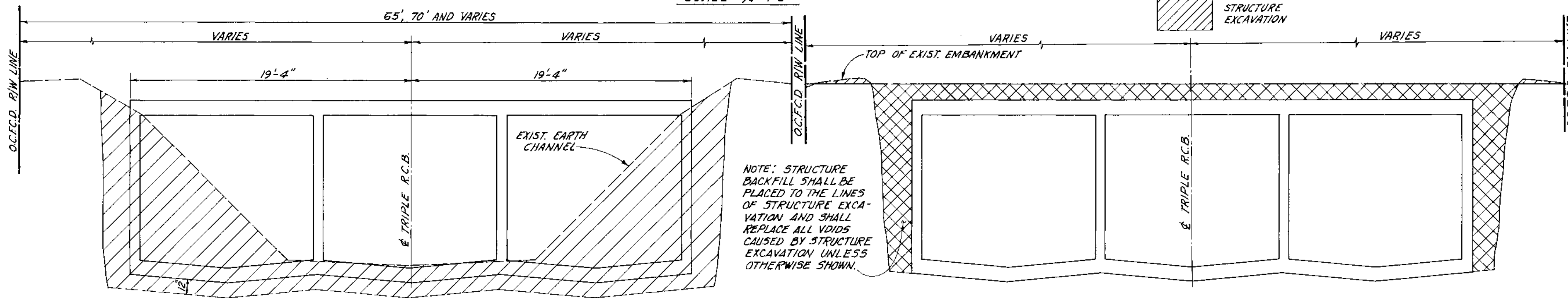


NOTE: STRUCTURE BACKFILL SHALL BE PLACED TO THE LINES OF STRUCTURE EXCAVATION AND SHALL REPLACE ALL VOIDS CAUSED BY STRUCTURE EXCAVATION UNLESS OTHERWISE SHOWN.



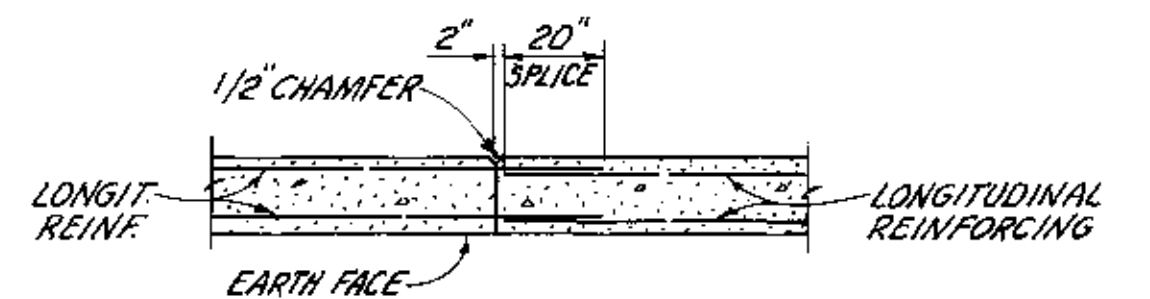
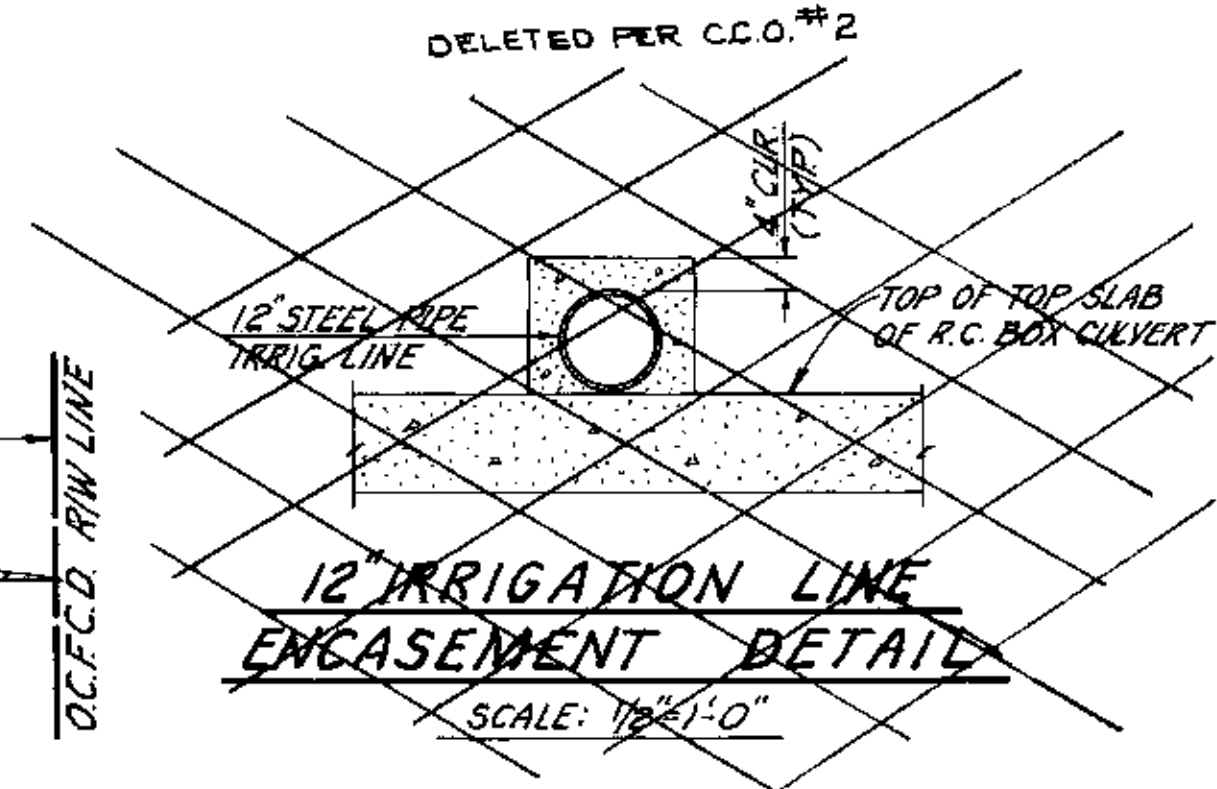
EARTHWORK LIMITS AT EXISTING R.C. BOX

SCALE: 1/4"=1'-0"



NOTE: STRUCTURE BACKFILL SHALL BE PLACED TO THE LINES OF STRUCTURE EXCAVATION AND SHALL REPLACE ALL VOIDS CAUSED BY STRUCTURE EXCAVATION UNLESS OTHERWISE SHOWN.

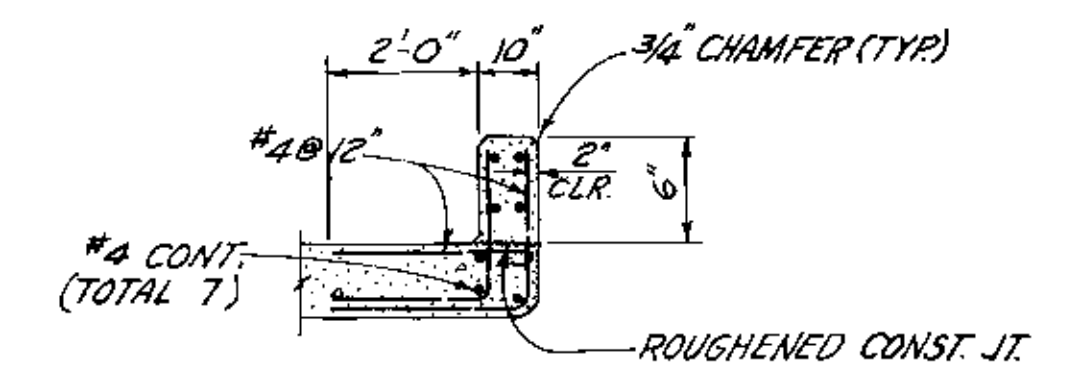
STRUCTURE BACKFILL
STRUCTURE EXCAVATION



NOTE: CONST. JOINT TO BE AT INTERVALS NOT LESS THAN 10' NOR MORE THAN 30'. JOINT TO BE IN THE SAME PLANE ACROSS ENTIRE STRUCTURE.

R.C. BOX CULVERT TRANSVERSE CONST. JOINT DETAIL

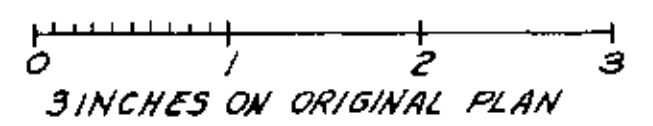
NO SCALE



NOTE: CULVERT REINF. NOT SHOWN

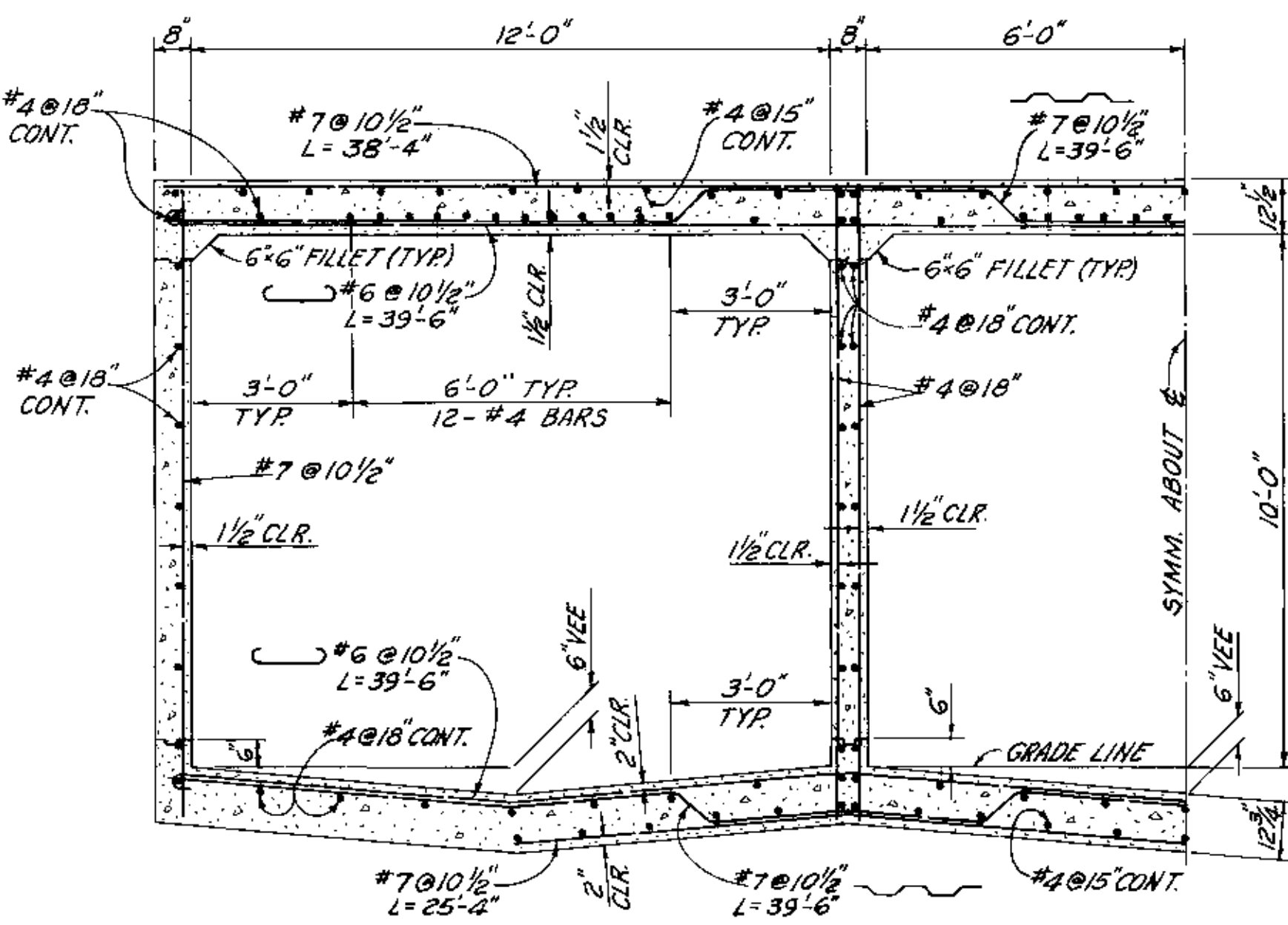
PARAPET SECTION

NO SCALE

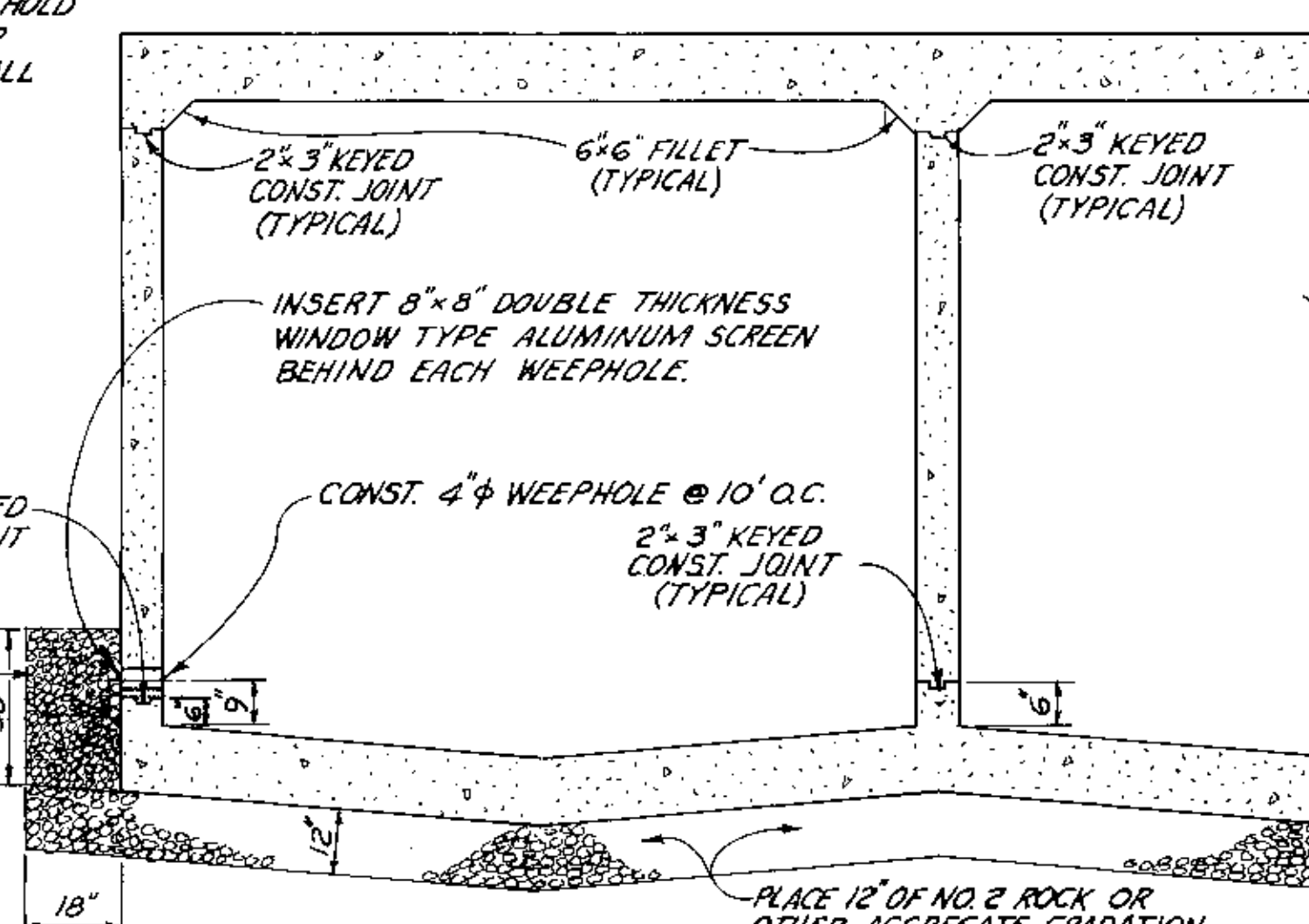


EARTHWORK LIMITS AT EXISTING EARTH CHANNEL

SCALE: 1/4"=1'-0"



NOTE: THE CONTRACTOR SHALL HOLD MINIMUM VERTICAL BAR SPACING THROUGHOUT ALL R.C.B. CURVES.



TYPICAL BEDDING & CONST. JOINT DETAIL

SCALE: 3/8"=1'-0"

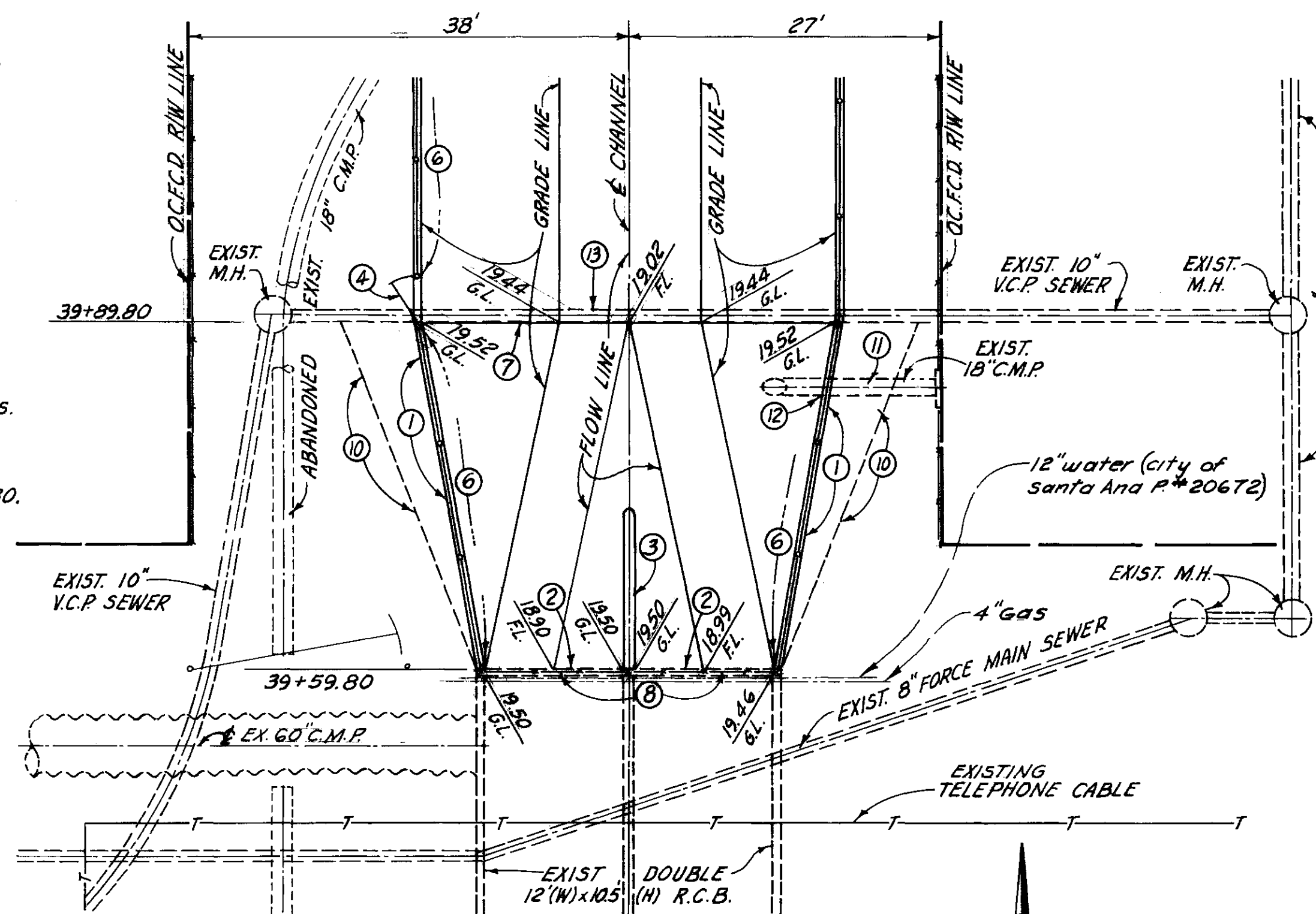
DESIGN CRITERIA FOR ALL REINFORCED CONCRETE:

- $f_c = 3,000$ PSI
- $f_t = 1,200$ PSI
- $f_s = 20,000$ PSI
- $v = 90$ PSI SHEAR
- $u = 300$ PSI BOND

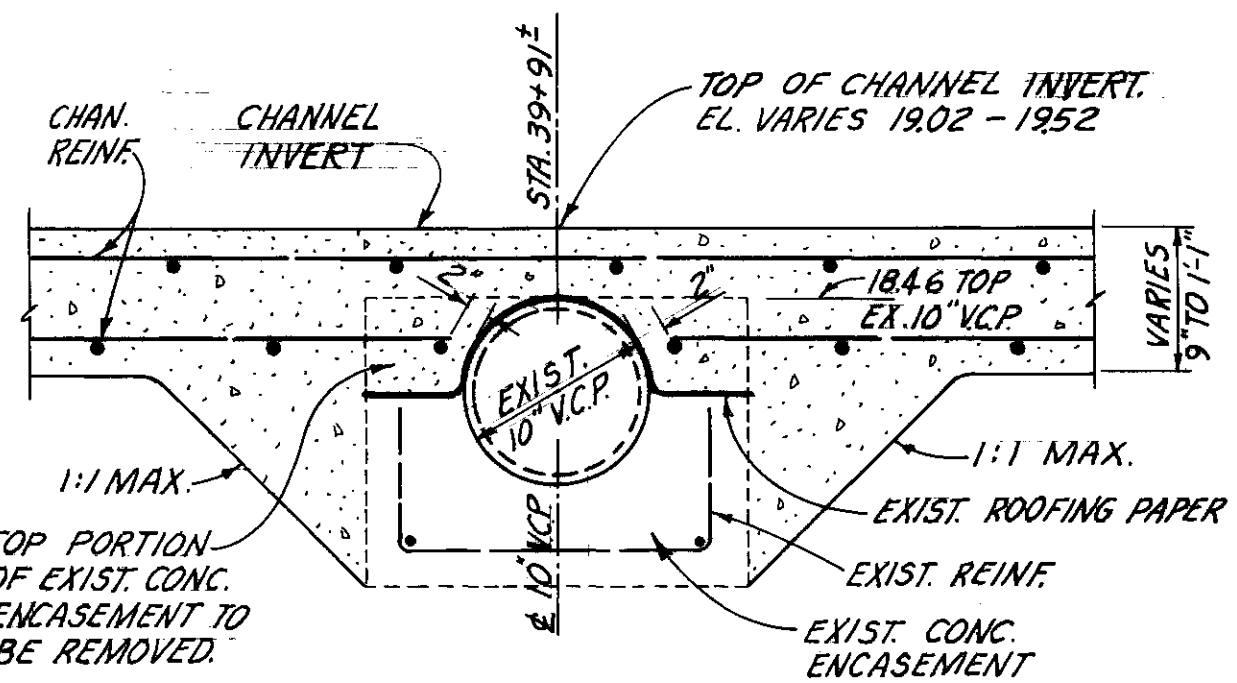
PRELIMINARY REVISION CODE			ORANGE COUNTY FLOOD CONTROL DISTRICT		
Disregard Prints Bearing Earlier Codes			SANTA ANA - GARDENS CHANNEL		
MARK	DATE	DESCRIPTION	TRIPLE R.C. BOX STRUCTURAL & EARTHWORK DETAILS		
Δ	1-74	AS BUILT			
DESIGNED	U.G.F.		RECOMMENDED		
DRAWN	G.E.V.		CHECKED R.E.M.		
SUBMITTED	V.T.N. ORANGE CO.		SCALE	DATE	DWG. NO.
			AS SHOWN	MAR. 1972	F02-701-1-A

CONSTRUCTION NOTES

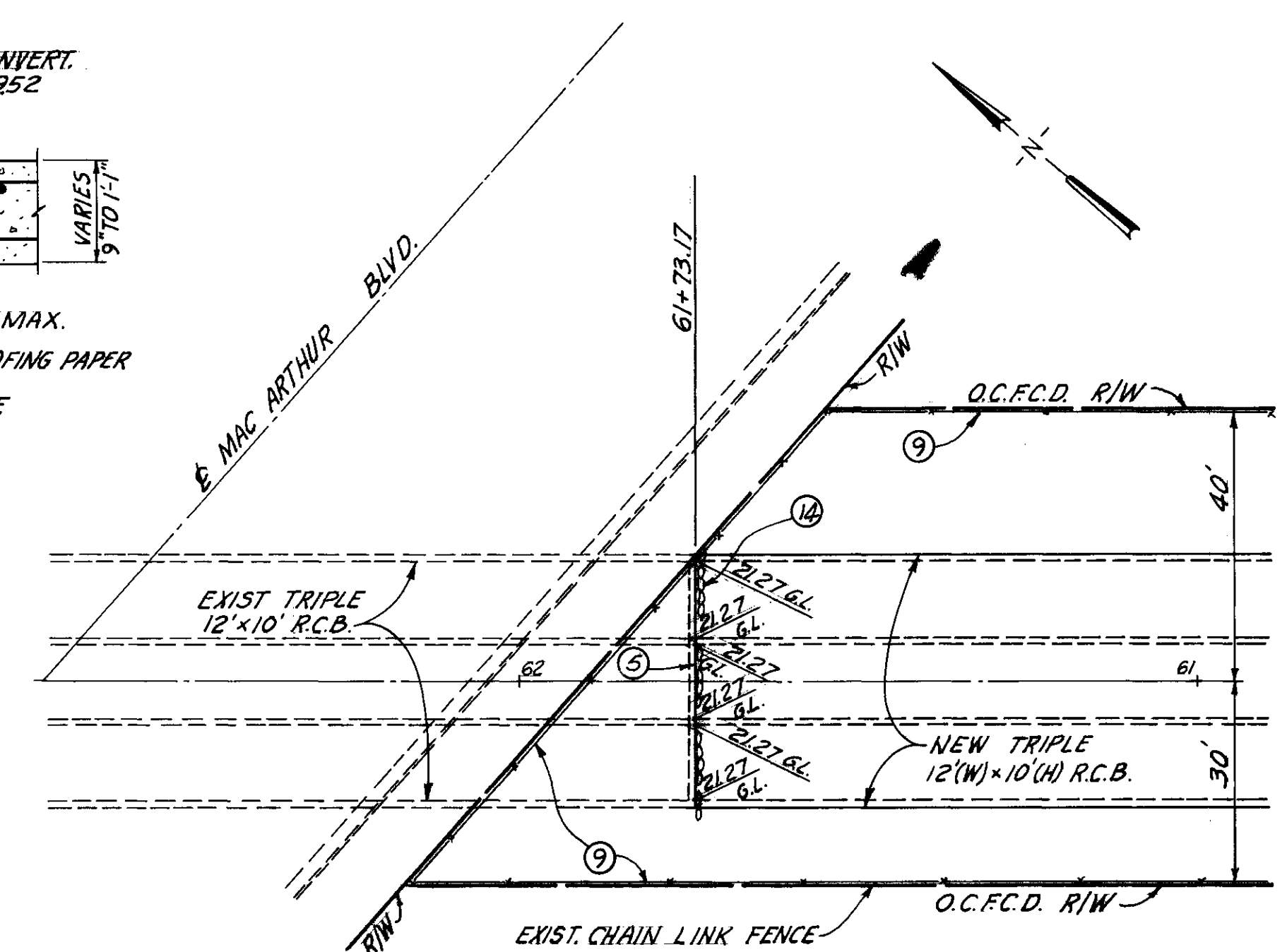
- 1 CONST. 30 L.F. R.C. TRANSITION, SEE SHEET 6 FOR REINF. DETAILS.
- 2 JOIN EXIST. R.C.B. STRUCTURE, SEE CONSTRUCTION JOINT I DETAIL ON SHEET 6.
- 3 CONST. R.C. DEBRIS WALL, SEE DETAIL ON THIS SHEET.
- 4 CONST. 4' WIDE, SINGLE FRAME CHAIN LINK GATE, SEE DETAIL ON SHEET 11.
- 5 JOIN EXIST. R.C.B. STRUCTURE, SEE CONSTRUCTION JOINT II DETAIL ON THIS SHEET.
- 6 CONST. TYPE I CHAIN LINK FENCE, SEE DETAILS ON SHEET 11.
- 7 CONST. JOINT II, SEE DETAIL ON SHEET 6.
- 8 EXISTING CHAIN LINK FENCE, PROTECT IN PLACE.
- 9 PROTECT IN PLACE EXISTING CHAIN LINK FENCE AND GATES. REMOVE EXISTING BARB WIRE FENCE.
- 10 REMOVE EXIST. CONC. TRANSITION.
- 11 CONST. NEW 18" C.M.P. TO JOIN CHANNEL WALL AT FL. ELEV. 28.30. REMOVE EXISTING PIPE AS REQUIRED AND JOIN.
- 12 JOIN INLET TO CONC. WALL, SEE DETAIL ON THIS SHEET.
- 13 ENCASE EXIST. 10" V.C.P. SEWER INTO CHANNEL SLAB PER DETAIL ON THIS SHEET.
- 14 REMOVE EXIST. BULKHEAD PLANKS.



PLAN
TRANSITION AT SUNFLOWER AVENUE
SCALE: 1" = 10'

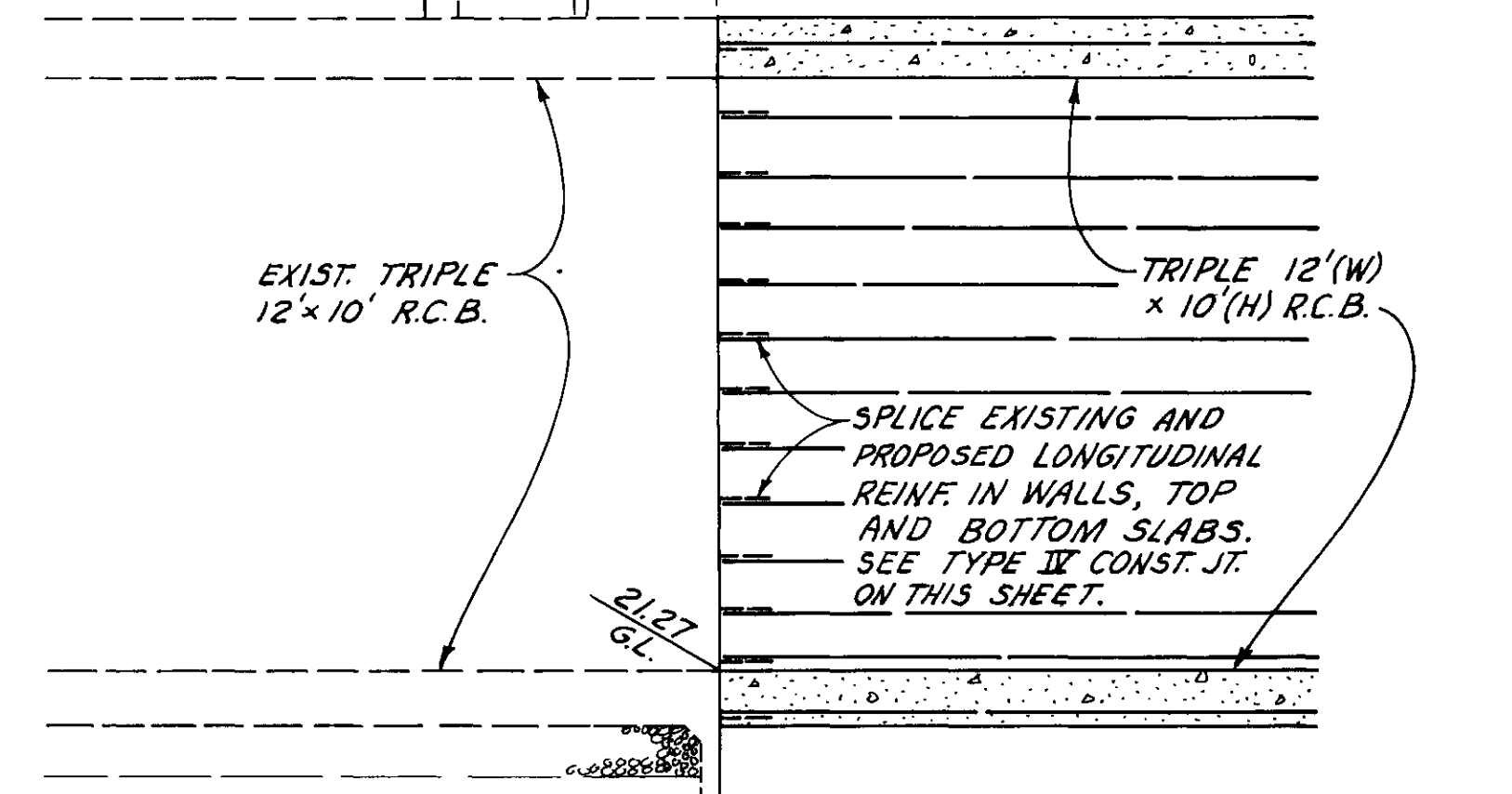


10" V.C.P. ENCASEMENT DETAIL
NO SCALE



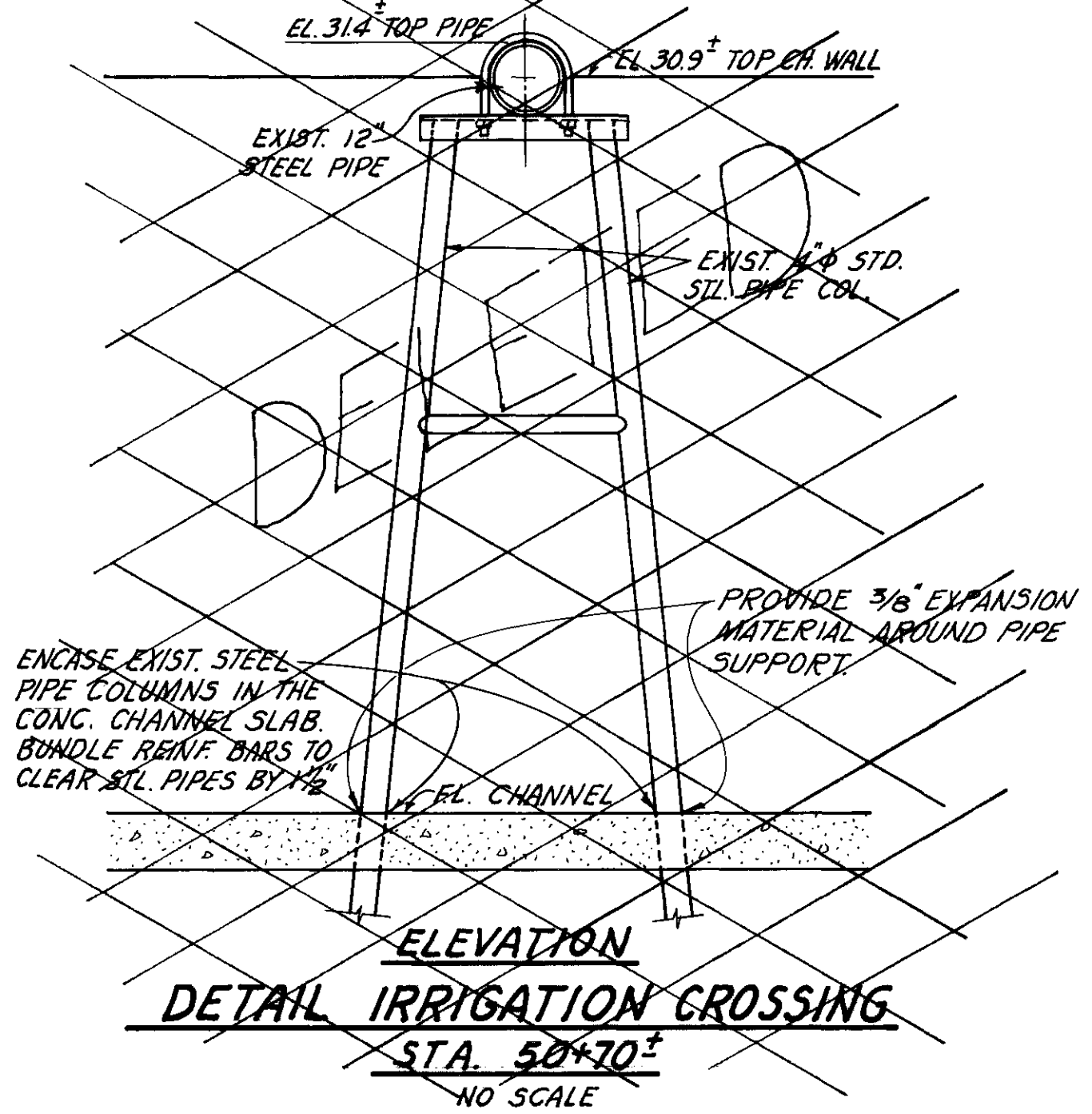
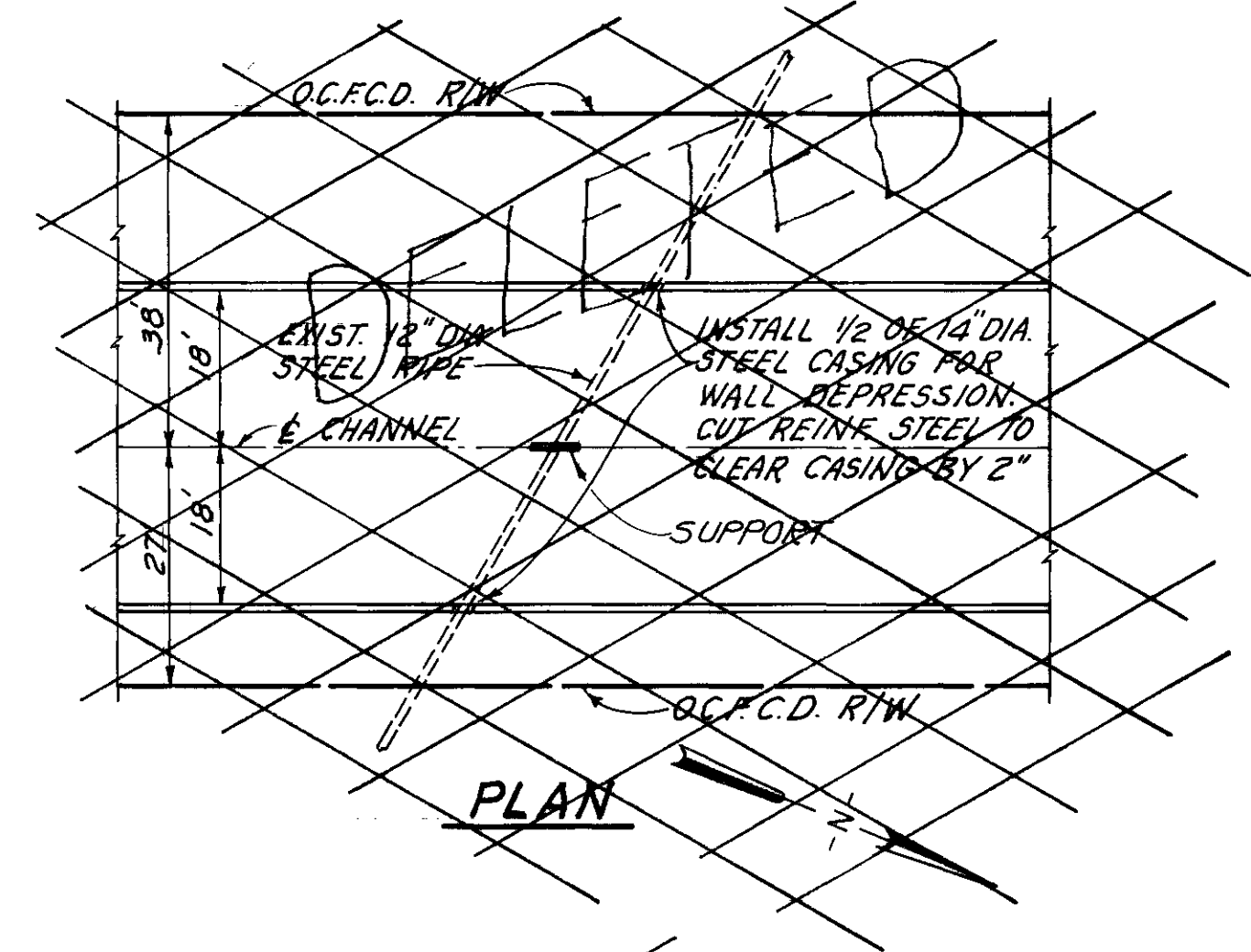
PLAN
SCALE: 1" = 20'

NOTE:
TRANSVERSE REINF. NOT SHOWN. THE EXIST. REINF. SHALL BE THOROUGHLY CLEANED AND EXIST. METAL SHALL BE FREE FROM RUST, MUD, OIL OR ANY FOREIGN MATTER THAT WILL DESTROY OR REDUCE THE BOND.

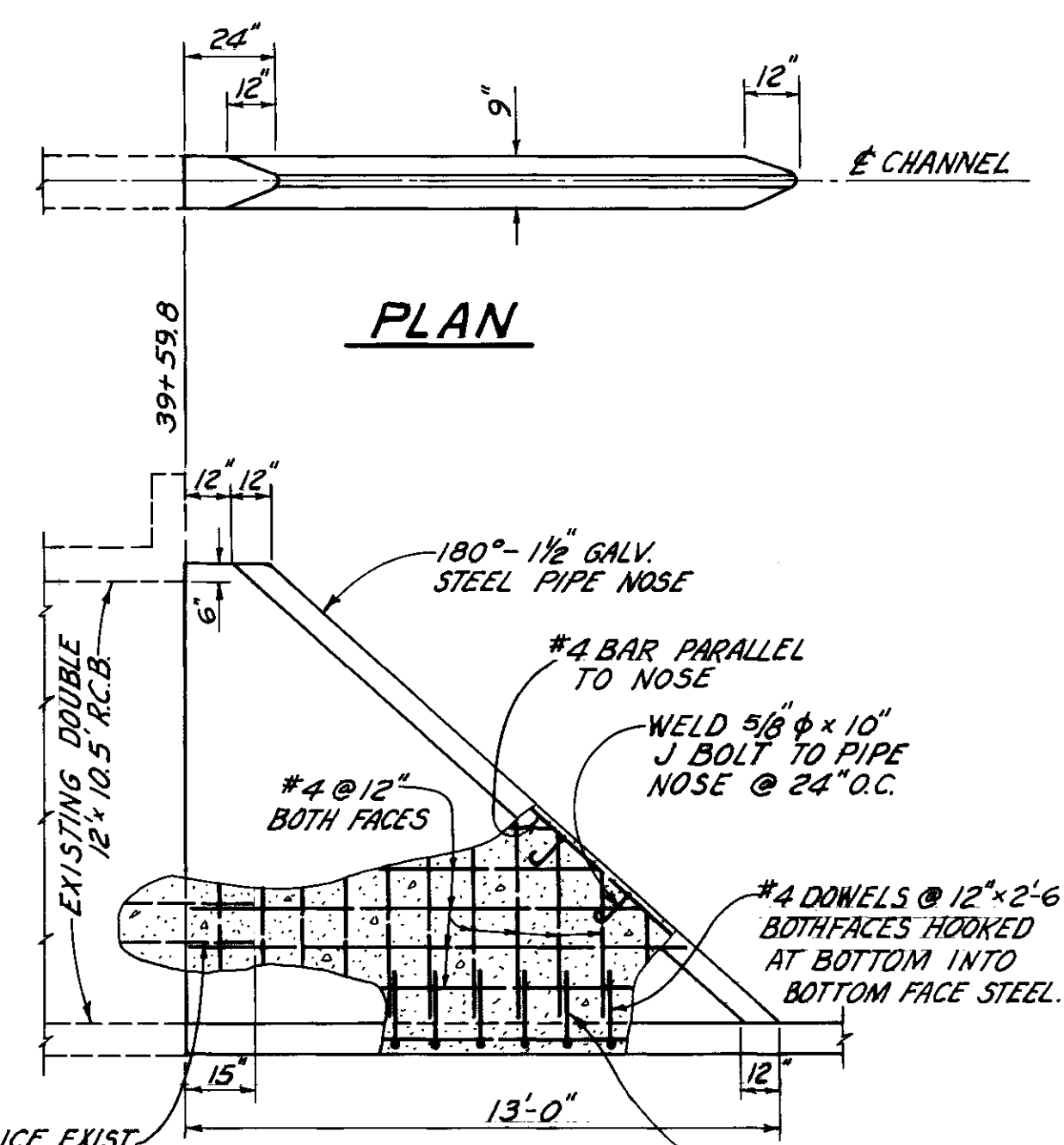


PROFILE
NO SCALE

MAC ARTHUR BLVD. R.C.B.
(CONSTRUCTION NOTES - UPPER LEFT CORNER)

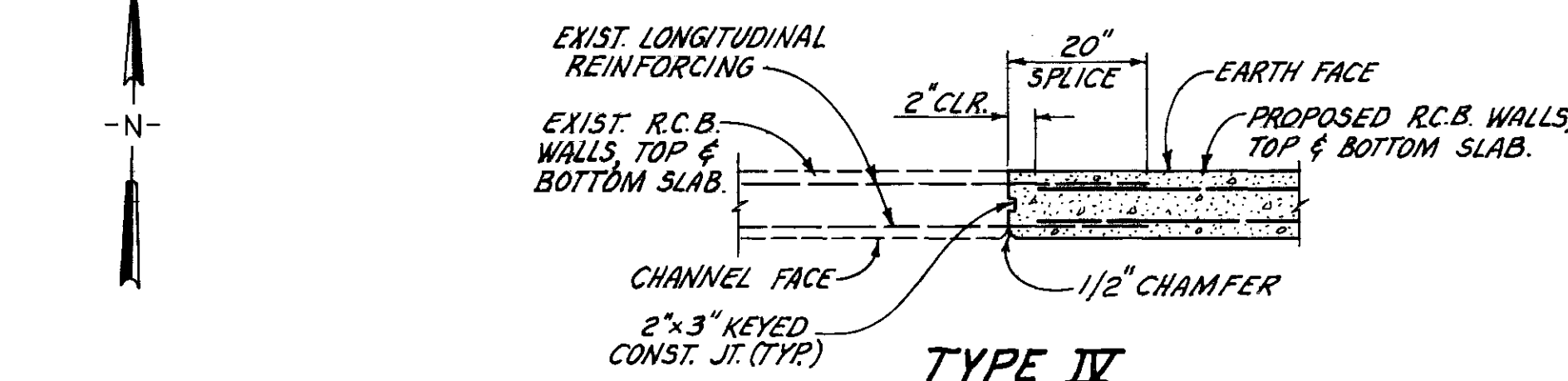


ELEVATION
DETAIL IRRIGATION CROSSING
STA. 50+70.2
NO SCALE



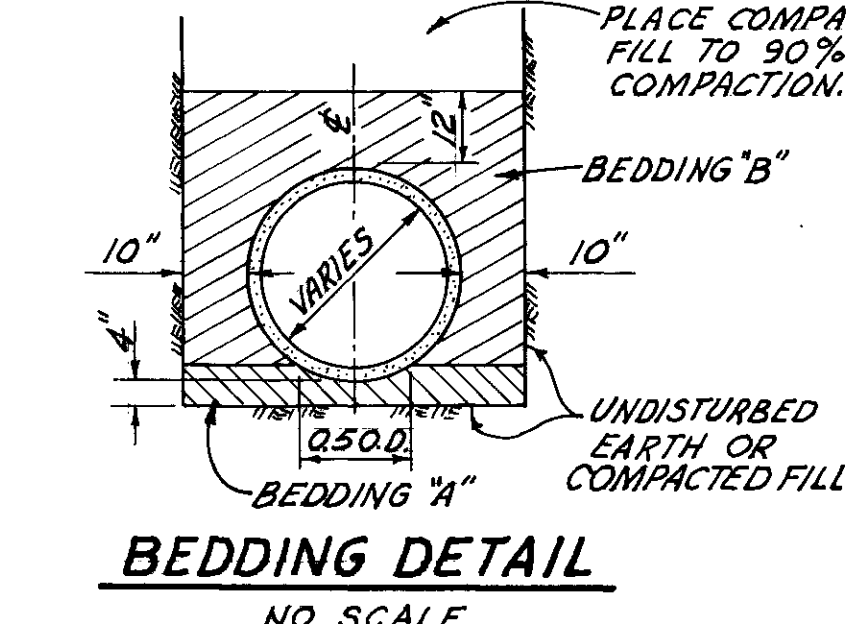
ELEVATION
DEBRIS WALL
NO SCALE

NOTE:
WHEN REMOVING EXIST. DEBRIS WALL 15' (AS SHOWN) OF THE EXIST. REINFORCING, SHALL BE THOROUGHLY CLEANED & EXIST. METAL SHALL BE FREE FROM RUST, MUD, OIL OR ANY FOREIGN MATTER THAT WILL DESTROY OR REDUCE THE BOND.



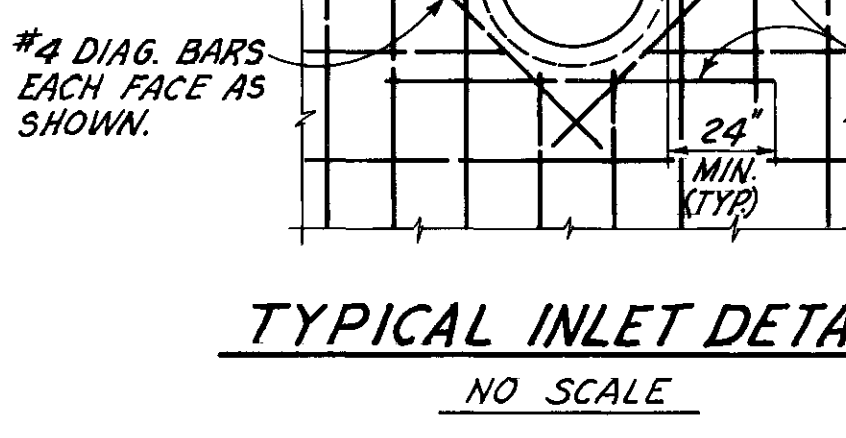
TYPE II
CONSTRUCTION JOINT
DETAIL
NO SCALE

NOTE:
BEDDING "A" SHALL BE COMPOSED OF SAND, NO 3 CRUSHED ROCK OR GRAVEL OR OTHER GRANULAR MATL. APPLD. BY THE ENGR. W/MIN. SAND EQUIV. OF 60 & COMPACTED TO 90% RELATIVE COMPACTION.
BEDDING "B" SHALL BE COMPOSED OF SAND OR OTHER GRANULAR MATERIAL APPROVED BY THE ENGR. WITH MIN. SAND EQUIV. OF 30 & COMPACTED TO 90% RELATIVE COMPACTION.



BEDDING DETAIL
NO SCALE

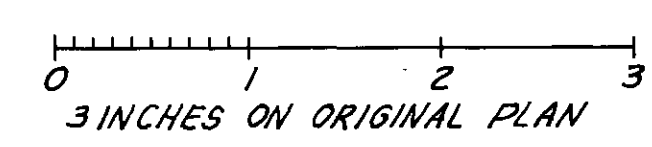
NOTE:
THE CONTRACTOR MAY AS AN OPTION USE SAND-CEMENT SLURRY BACKFILL CASE I PER SECTION 28-23 OF THE SPECIFICATIONS.

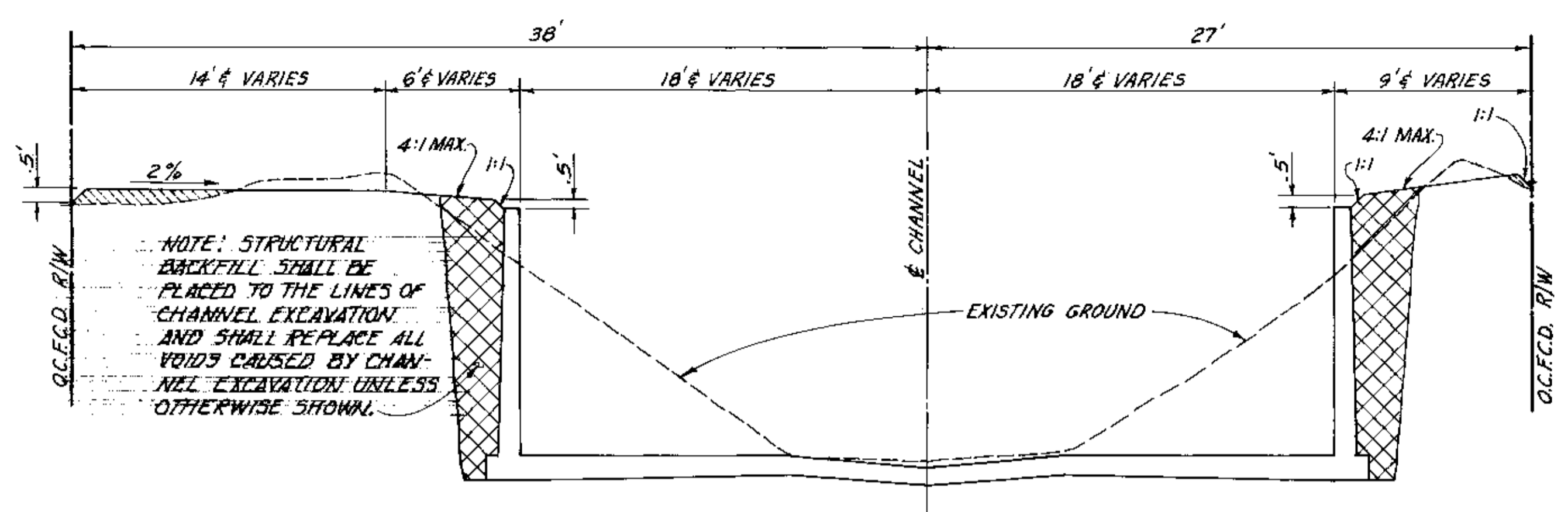


TYPICAL INLET DETAIL
NO SCALE

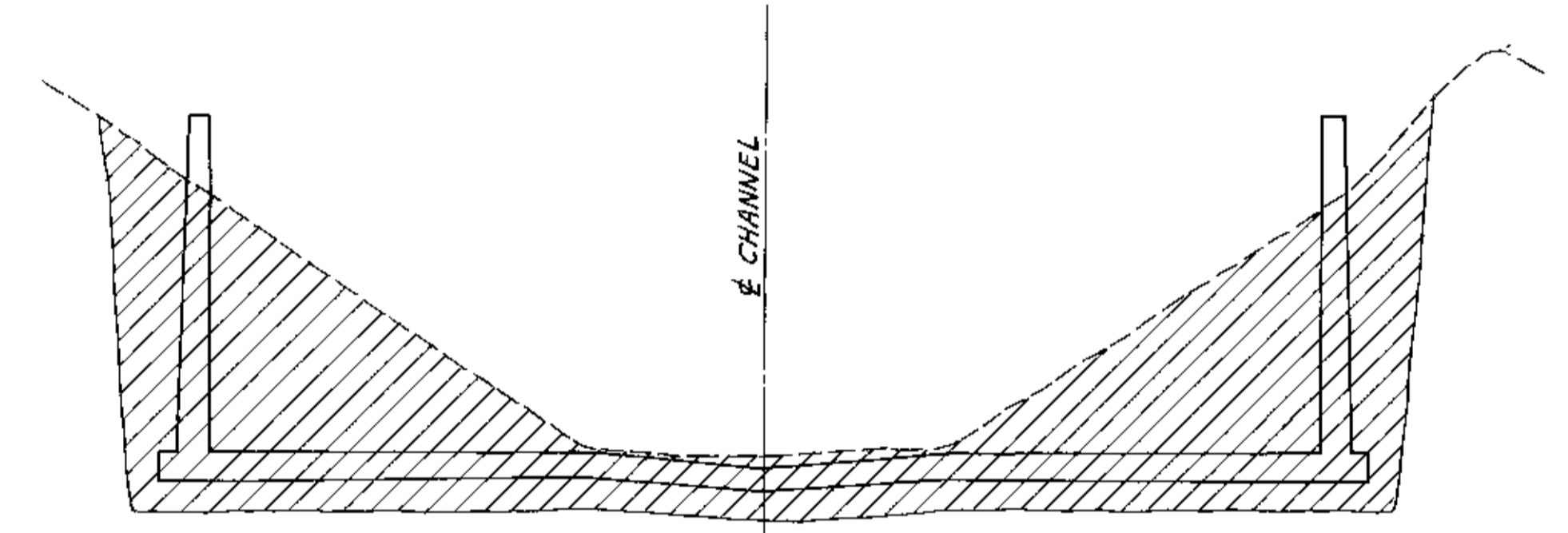
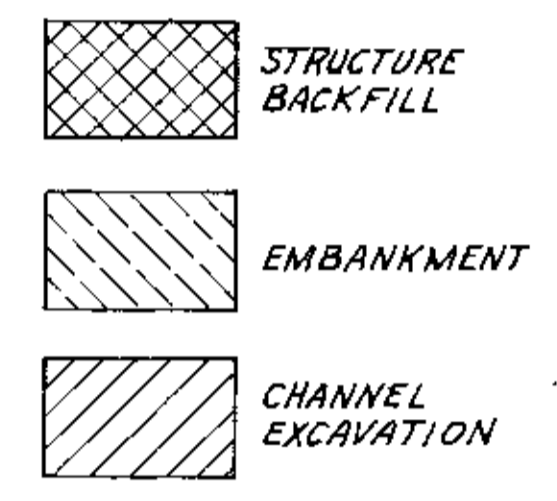
DATUM = O.C.F.C.D. = O.C.S. ADJUSTED 1957.
BENCH MARK NO. F2-2 ELEV. 34.70.
A SPIKE IN RP #599104E, ON SOUTH SIDE OF SUNFLOWER AVE, APPROX. 100' EAST OF EXISTING F02 R.C.B. AND 700' EAST OF BRISTOL STREET.
BENCH MARK NO. F2-8 ELEV. 34.87.
THE N.E. CORNER OF SQUARE MANHOLE RIM ON THE NORTH SIDE OF ALTON AVE. APPROX. 50' WEST OF F02 CHANNEL.

PRELIMINARY REVISION CODE			ORANGE COUNTY FLOOD CONTROL DISTRICT	
Disregard Prints Bearing Earlier Codes			SANTA ANA - GARDENS CHANNEL TRANSITION DETAIL AT SUNFLOWER AVE, MACARTHUR BLVD, STRUCTURAL AND MISCELLANEOUS DETAILS	
MARK	DATE	DESCRIPTION	DESIGNED	RECOMMENDED
Δ	1-74	As Built	U.G.F.	
			DRAWN	CHECKED
			G.E.V.	R.E.M.
			SUBMITTED	
			V.T.N. ORANGE CO.	
			SCALE	DATE
			AS SHOWN	MAR. 1972
			DWG. NO.	
			F02-701-1-A	

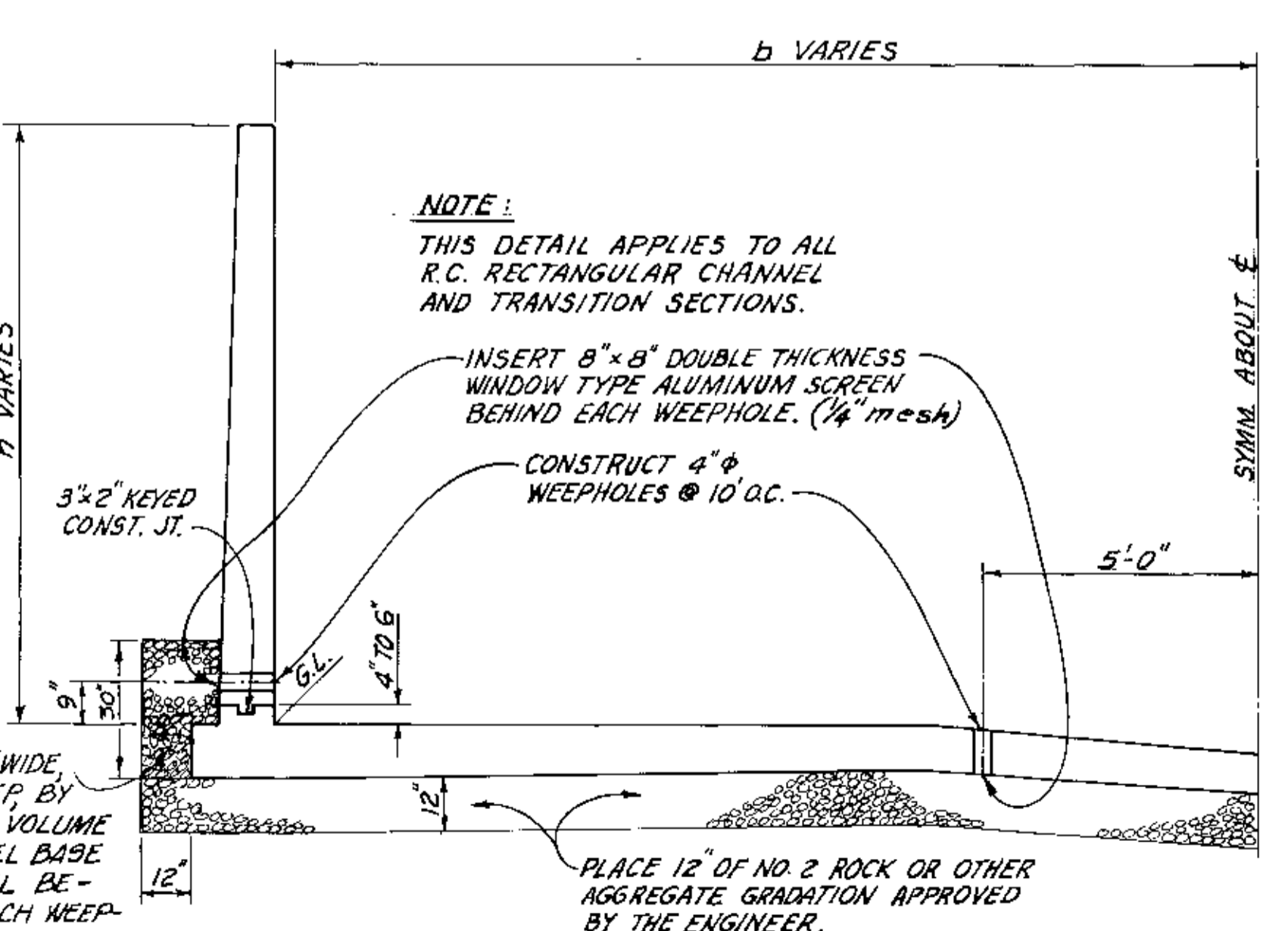




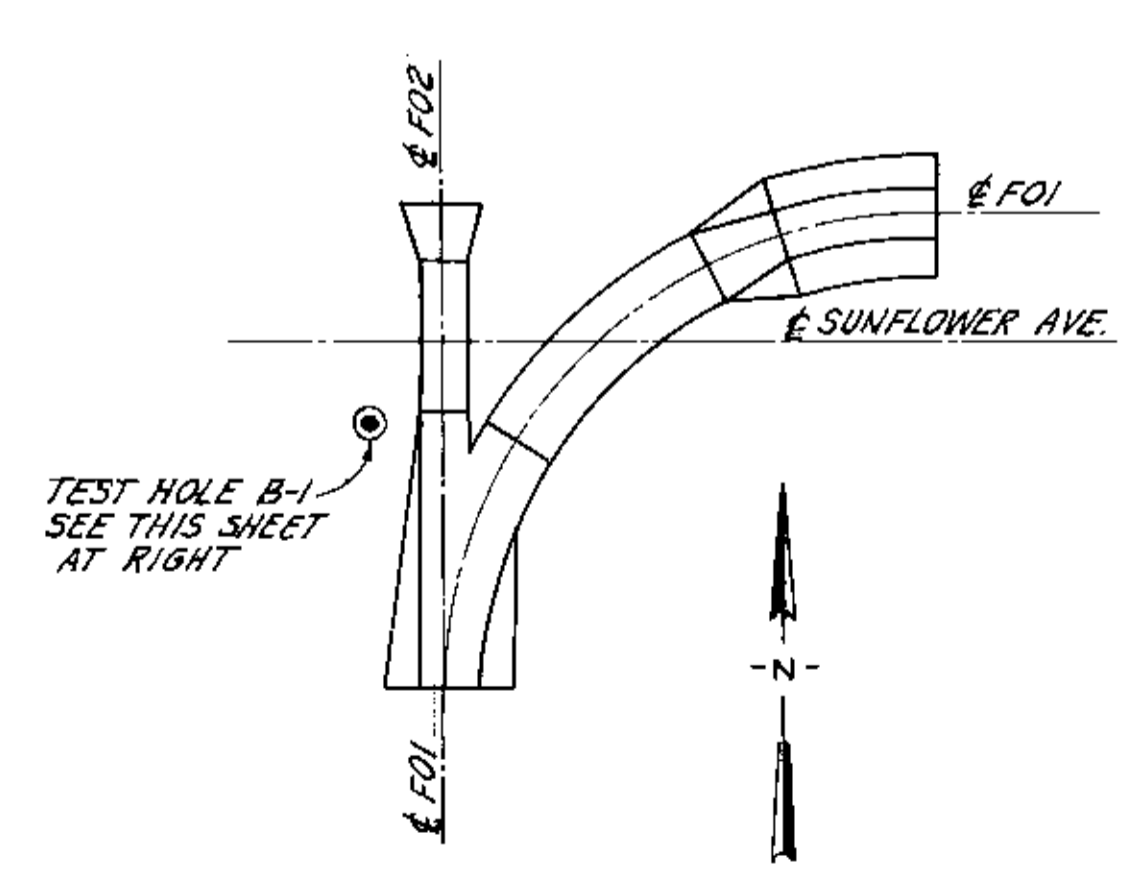
EARTHWORK LIMITS
SCALE: 1"=5'



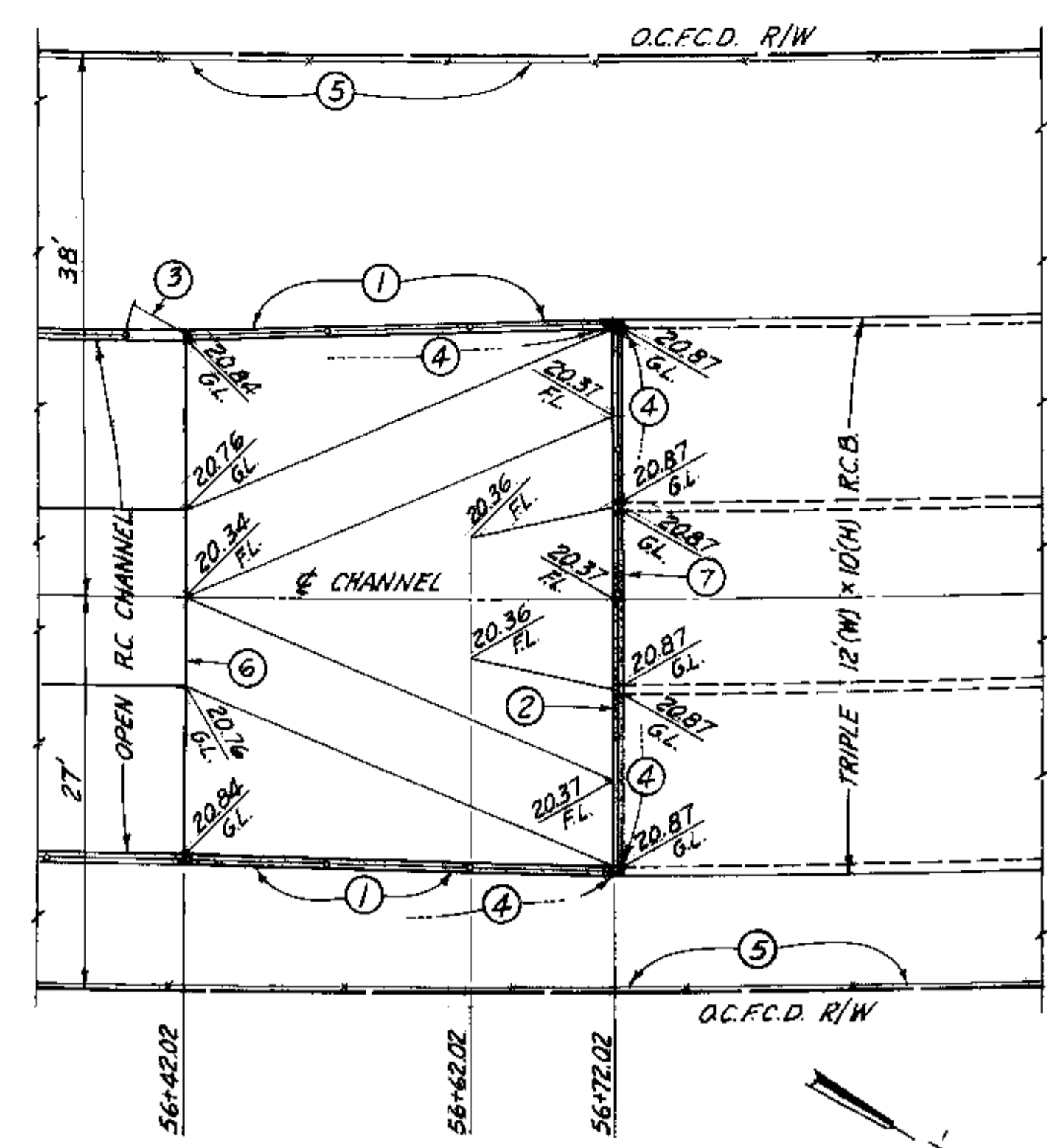
EARTHWORK LIMITS
SCALE: 1"=5'



TYP. BEDDING & CONST. JOINT DETAIL
SCALE: 3/8"=1'-0"

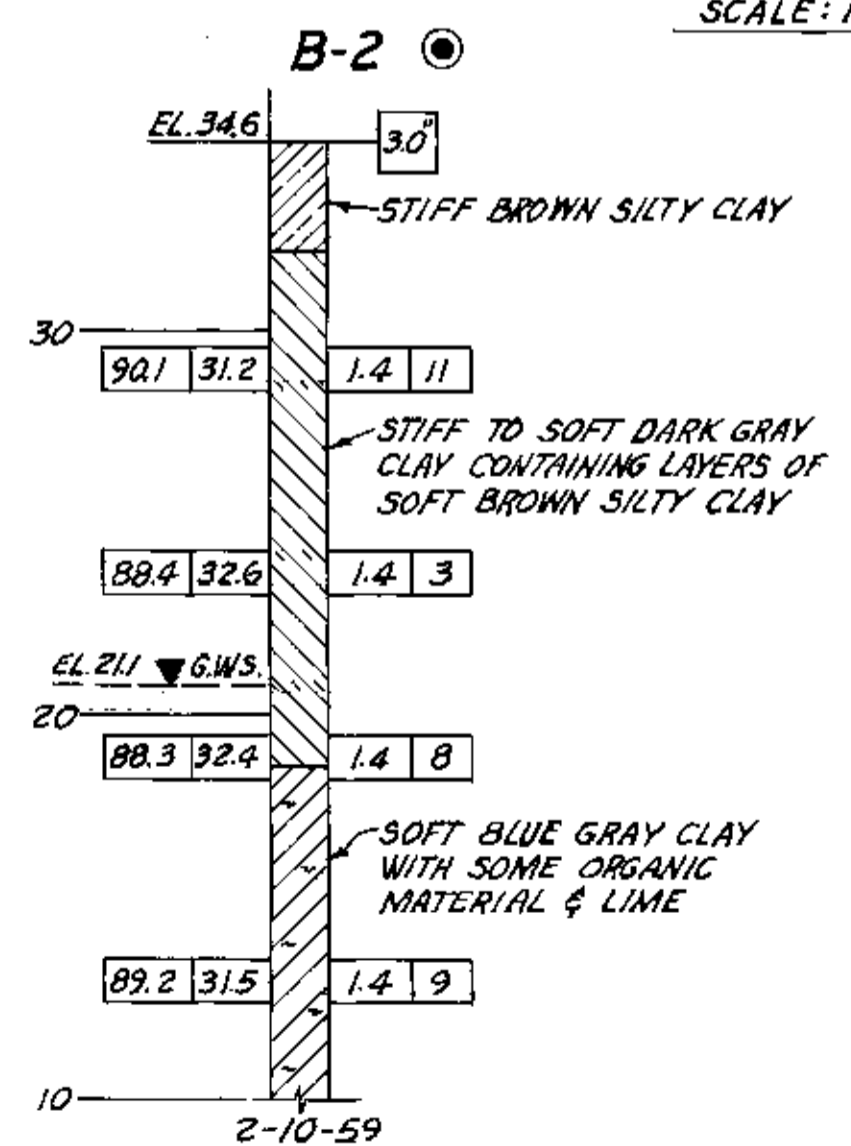
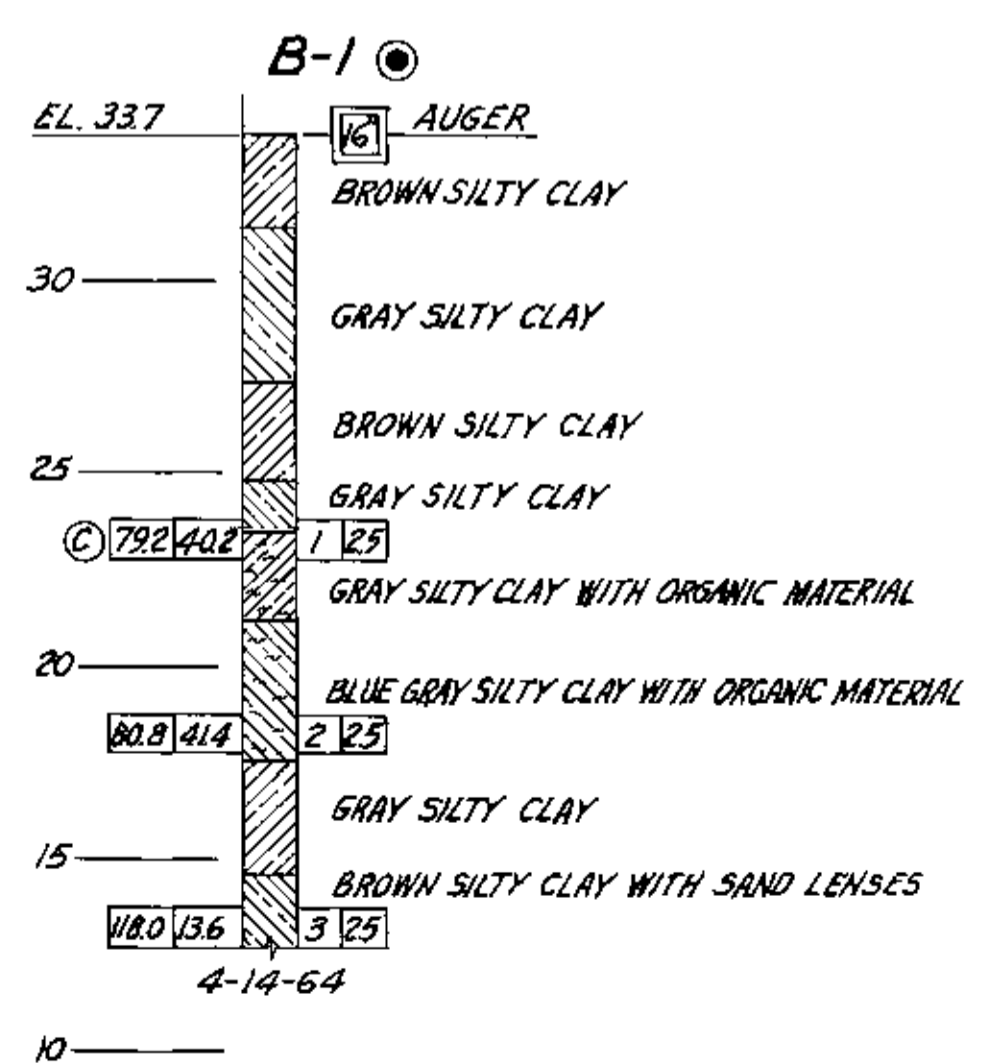
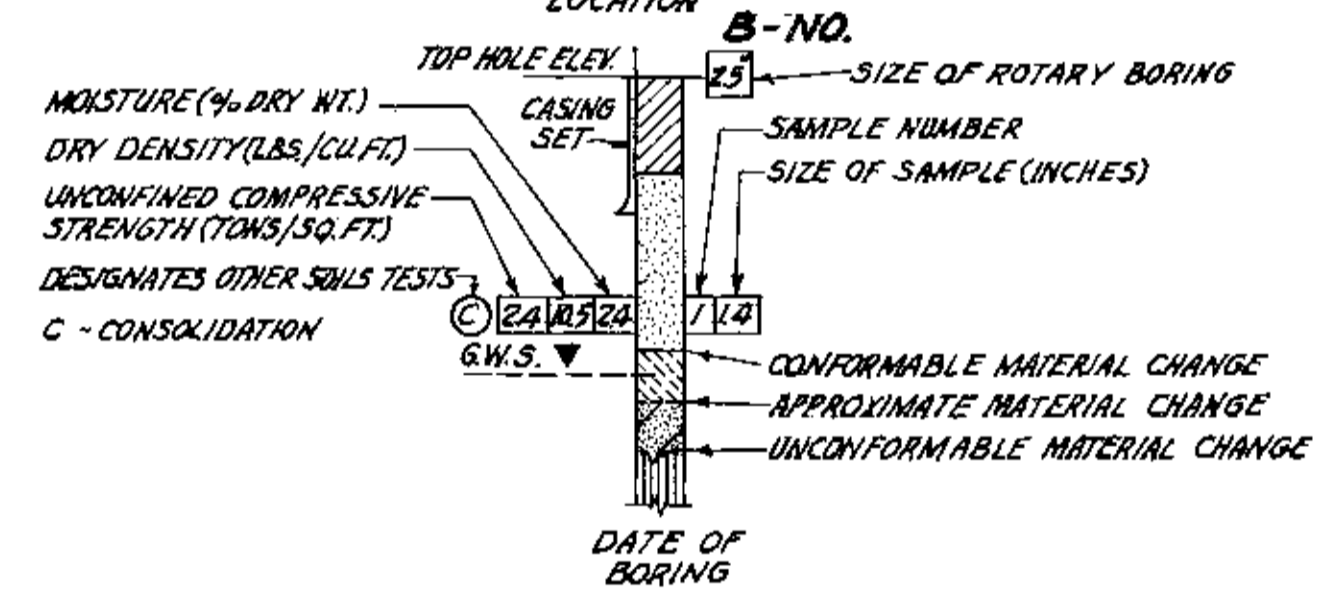


PLAN
SCALE: 1"=100'



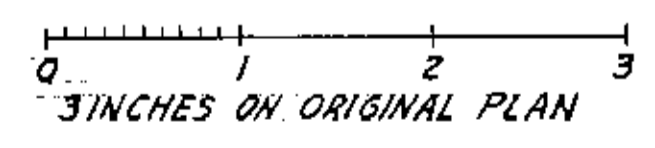
PLAN
TRANSITION AT DOWNSTREAM END OF TRIPLE 12' (W) x 10' (H) R.C.B.
SCALE: 1"=10'

LEGEND - ROTARY BORING



DATUM = O.C.F.C.D. = O.C.S. ADJUSTED 1957.
BENCH MARK NO. F2-2 ELEV. 34.70.
A SPIKE IN PP #5991045, ON SOUTH SIDE OF SUNFLOWER AVE., APPROX. 100' EAST OF EXISTING FO2 R.C.B. AND 700' EAST OF BRISTOL STREET.

BENCH MARK NO. F2-B ELEV. 34.87
THE N.E. CORNER OF SQUARE MANHOLE RIM ON THE NORTH SIDE OF ALTON AVE. APPROX. 50' WEST OF FO2 CHANNEL.



PRELIMINARY REVISION CODE		ORANGE COUNTY FLOOD CONTROL DISTRICT	
Disregard Prints Bearing Earlier Codes		SANTA ANA - GARDENS CHANNEL	
TRANSITION DETAIL AT DOWNSTREAM END OF TRIPLE 12' x 10' R.C.B., EARTHWORK DTL. & LOG OF TEST BORINGS.		RECOMMENDED	
DESIGNED: U.G.F.		CHECKED: R.E.M.	
DRAWN: G.E.V.		SUBMITTED: [Signature]	
SCALE: AS SHOWN		DATE: MAR. 1972	
DWG. NO. F02-701-1-A			

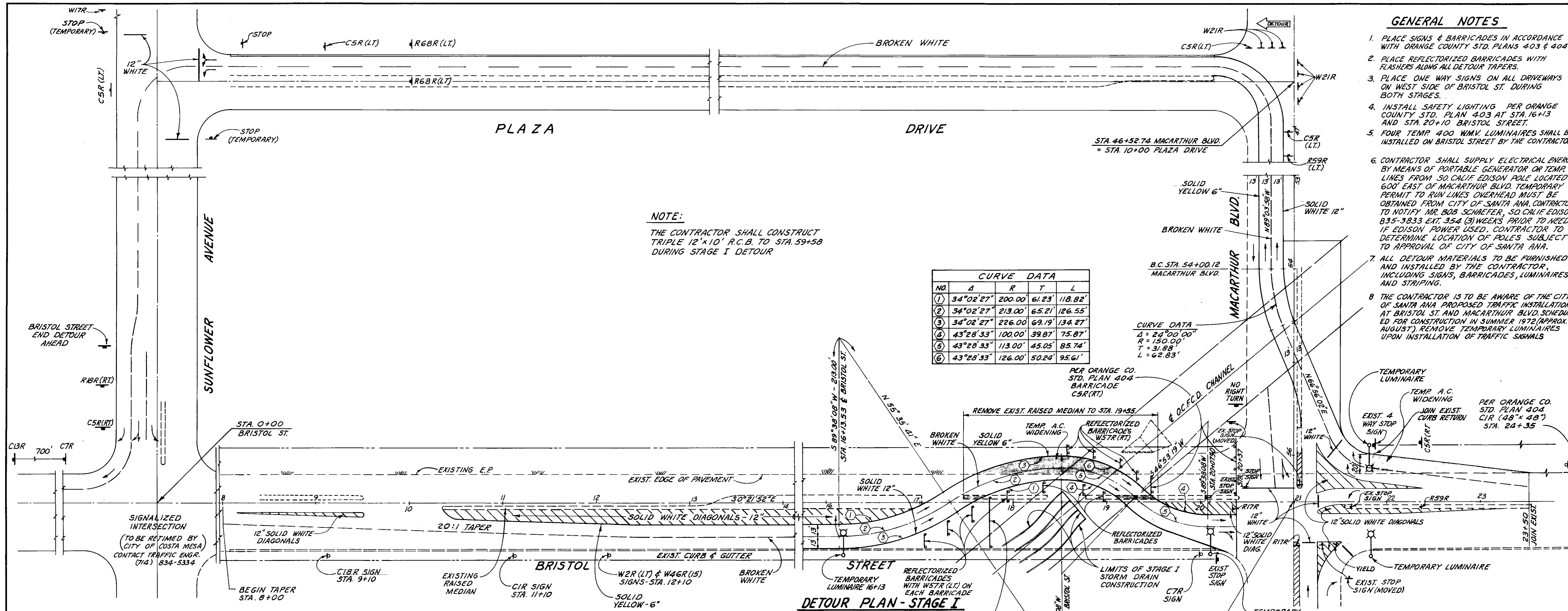
GENERAL NOTES

1. PLACE SIGNS & BARRICADES IN ACCORDANCE WITH ORANGE COUNTY STD. PLANS 403 & 404
2. PLACE REFLECTORIZED BARRICADES WITH FLASHERS ALONG ALL DETOUR TAPERS.
3. PLACE ONE WAY SIGNS ON ALL DRIVEWAYS ON WEST SIDE OF BRISTOL ST. DURING BOTH STAGES.
4. INSTALL SAFETY LIGHTING PER ORANGE COUNTY STD. PLAN 403 AT STA. 16+13 AND STA. 20+10 BRISTOL STREET.
5. FOUR TEMP 400 WIMV LUMINAIRES SHALL BE INSTALLED ON BRISTOL STREET BY THE CONTRACTOR.
6. CONTRACTOR SHALL SUPPLY ELECTRICAL ENERGY BY MEANS OF PORTABLE GENERATOR OR TEMP LINES FROM SO CALIF EDISON POLE LOCATED 600' EAST OF MACARTHUR BLVD. TEMPORARY PERMIT TO RUN LINES OVERHEAD MUST BE OBTAINED FROM CITY OF SANTA ANA. CONTRACTOR TO NOTIFY MR. BOB SCHAEFER, SO CALIF EDISON 835-3833 EXT. 354 (3) WEEKS PRIOR TO NEED IF EDISON POWER USED. CONTRACTOR TO DETERMINE LOCATION OF POLES SUBJECT TO APPROVAL OF CITY OF SANTA ANA.
7. ALL DETOUR MATERIALS TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR, INCLUDING SIGNS, BARRICADES, LUMINAIRES AND STRIPING.
8. THE CONTRACTOR IS TO BE AWARE OF THE CITY OF SANTA ANA PROPOSED TRAFFIC INSTALLATION AT BRISTOL ST. AND MACARTHUR BLVD. SCHEDULED FOR CONSTRUCTION IN SUMMER 1972 (APPROX. AUGUST). REMOVE TEMPORARY LUMINAIRES UPON INSTALLATION OF TRAFFIC SIGNALS.

NOTE:
THE CONTRACTOR SHALL CONSTRUCT TRIPLE 12" X 10" R.C.B. TO STA. 59+50 DURING STAGE I DETOUR

NO.	Δ	R	T	L
①	34°02'27"	200.00'	61.23'	118.82'
②	34°02'27"	213.00'	65.21'	126.55'
③	34°02'27"	226.00'	69.19'	134.27'
④	43°28'33"	100.00'	39.87'	75.87'
⑤	43°28'33"	113.00'	45.05'	85.74'
⑥	43°28'33"	126.00'	50.24'	95.61'

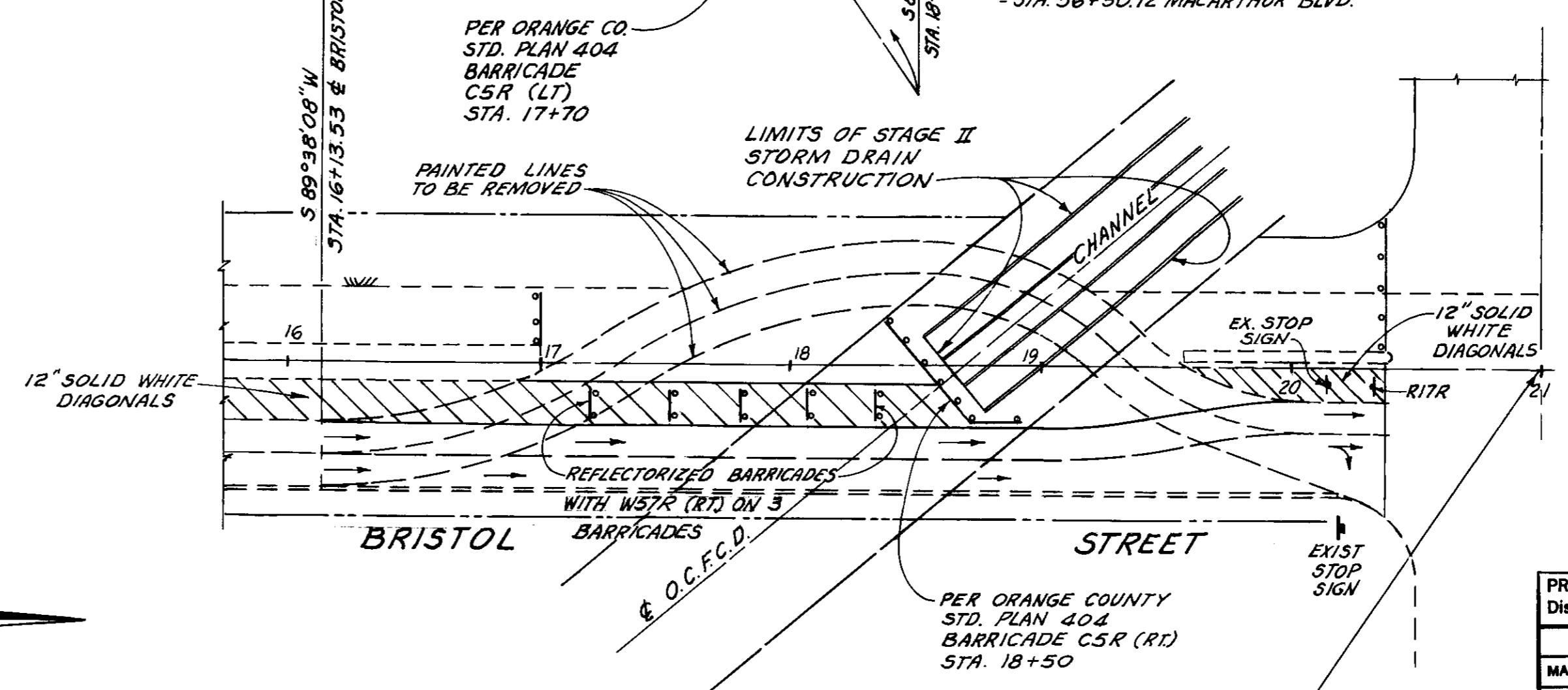
CURVE DATA
Δ = 24°00'00"
R = 150.00'
T = 31.88'
L = 62.83'



DETOUR PLAN - STAGE I

SCALE: 1" = 50'

NOTE:
REMOVE AND RECONSTRUCT MEDIAN CURB AS REQUIRED.
ALL MEDIAN CURB TO BE CONSTRUCTED SHALL BE TYPE B-1. SEE CITY OF SANTA ANA STD. DWG. 101 IN SPECIFICATIONS.

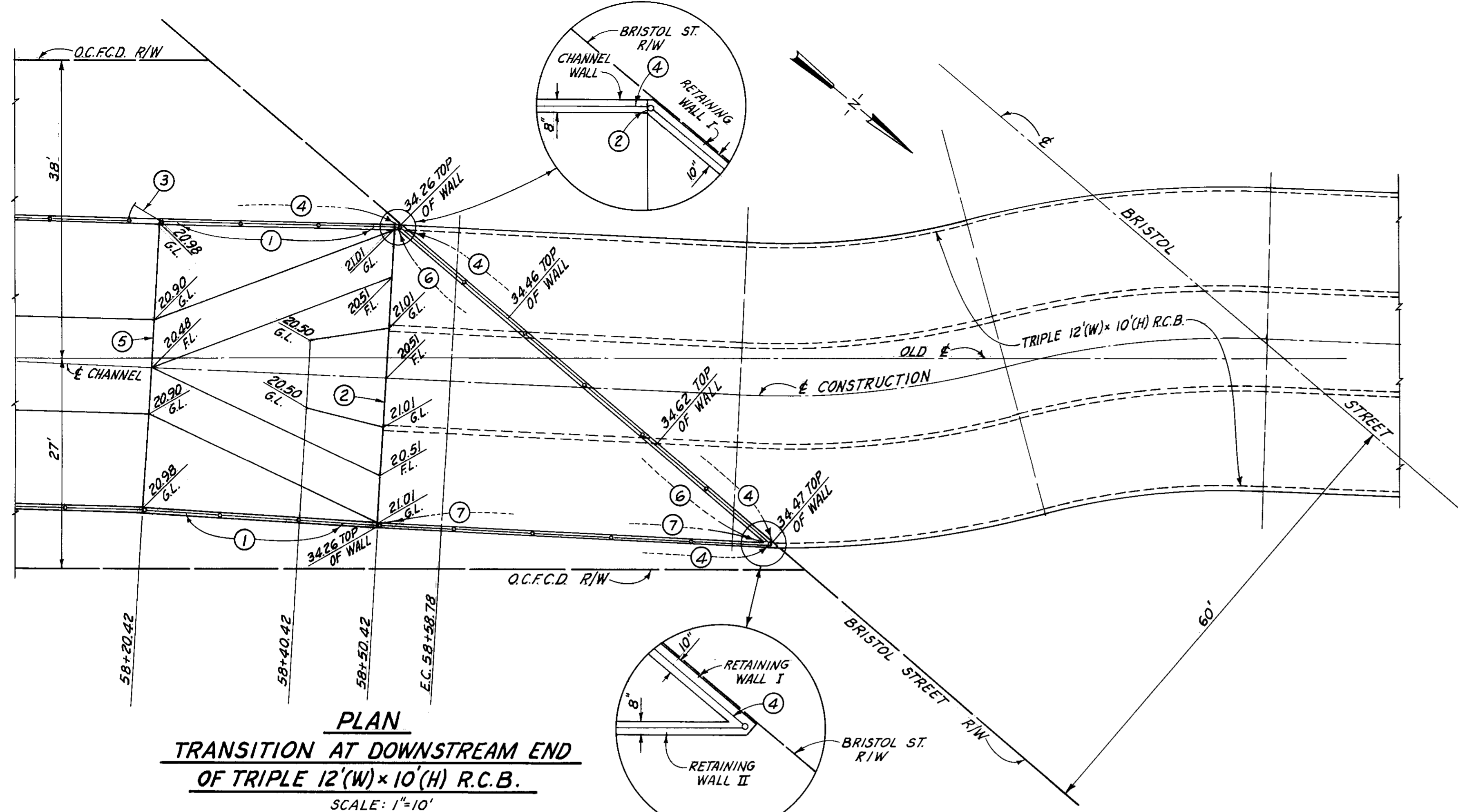


DETOUR PLAN - STAGE II

SCALE: 1" = 50'

0 1 2 3
3 INCHES ON ORIGINAL PLAN

PRELIMINARY REVISION CODE			ORANGE COUNTY FLOOD CONTROL DISTRICT	
Disregard Prints Bearing Earlier Codes			SANTA ANA - GARDENS CHANNEL	
REVISIONS			BRISTOL STREET DETOUR	
MARK	DATE	DESCRIPTION		
Δ	1-74	As Built		
DESIGNED: J.E.F.			RECOMMENDED: <i>[Signature]</i>	
DRAWN: G.E.V.			CHECKED: R.E.M.	
SUBMITTED: <i>[Signature]</i>			SCALE: AS SHOWN	
V.T.N. ORANGE CO.			DATE: MAR. 1972	
			DWG. NO. F02-701-1-A	



PLAN
TRANSITION AT DOWNSTREAM END
OF TRIPLE 12'(W) x 10'(H) R.C.B.
 SCALE: 1"=10'

NOTE:
 SEE SHEET NO. 5 FOR COMPLETE
 UTILITY INFORMATION.

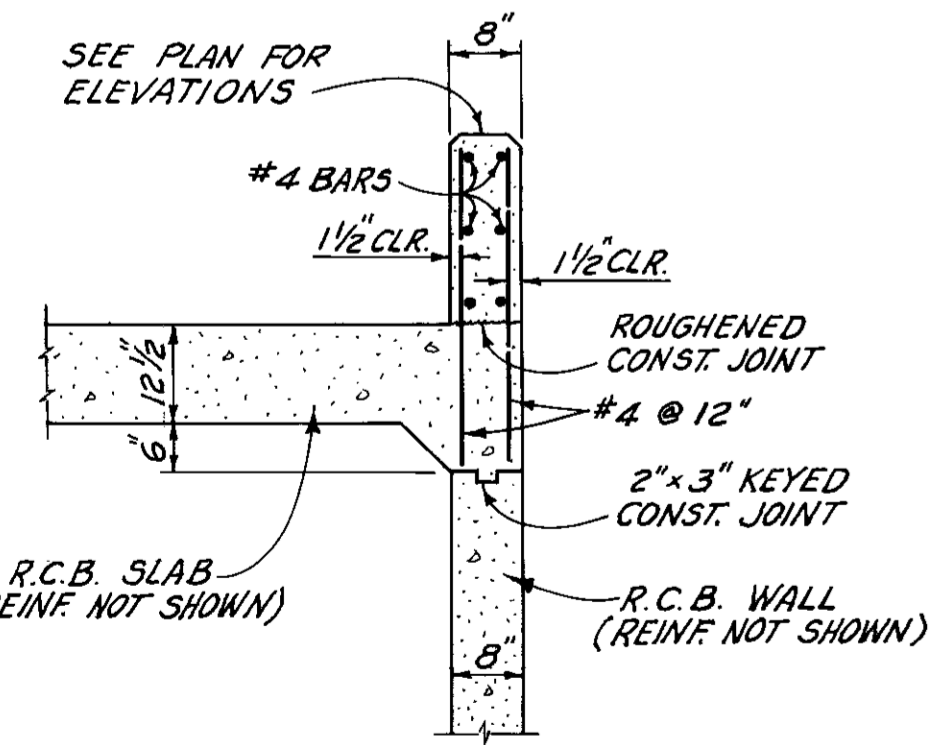
CONSTRUCTION NOTES

- ① CONSTRUCT 30 L.F. OF R.C. TRANSITION, SEE SHEET NO. 6 FOR REINF. DETAILS (USE TYPICAL SECTION STA. 56+42.02 TO STA. 56+72.02, MAX. WALL HEIGHT = 13'-3") AND SEE THIS SHEET FOR STRUCTURAL DATA.
- ② JOIN TRIPLE 12'(W) x 10'(H) R.C.B. STRUCTURE, SEE CONSTRUCTION JOINT III DETAIL ON SHEET NO. 6.
- ③ CONST. 4' WIDE SINGLE FRAME CHAIN LINK GATE, SEE DETAILS ON SHEET NO. 11.
- ④ CONST. TYPE I CHAIN LINK FENCE, SEE DETAILS ON SHEET NO. 11.
- ⑤ CONSTRUCTION JOINT II SEE DETAIL ON SHEET NO. 6.
- ⑥ CONST. RETAINING WALL I PER DETAIL ON THIS SHEET.
- ⑦ CONST. RETAINING WALL II PER DETAIL ON THIS SHEET.

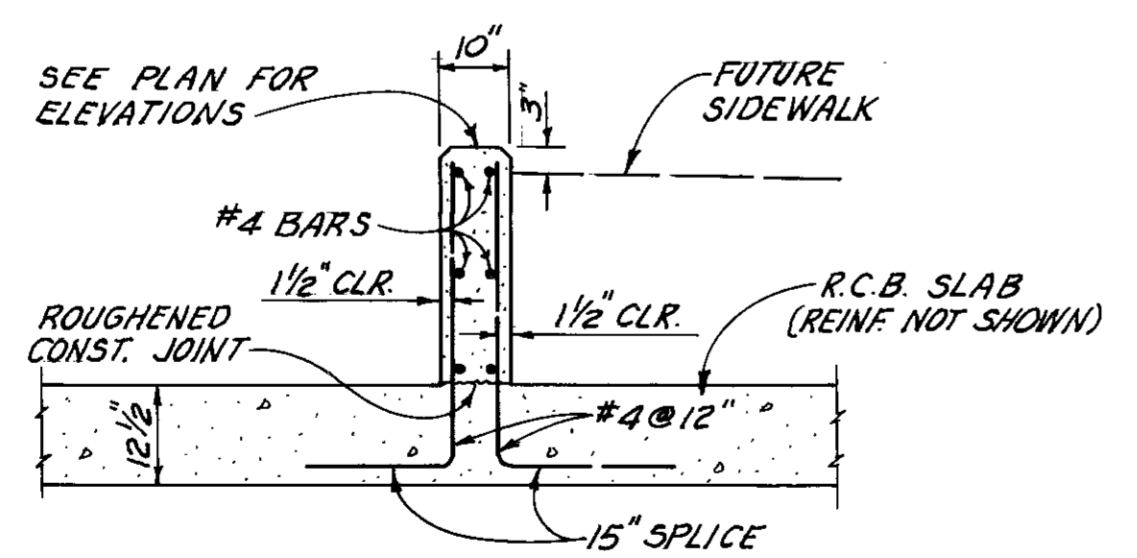
GENERAL NOTES

1. UP TO AND INCLUDING JULY 1, 1972, THE DISTRICT MAY AT ITS OPTION DELETE ALL CONSTRUCTION OF THE TRIPLE 12'(W) x 10'(H) R.C.B. BETWEEN STA. 56+72.02 AND STA. 58+50.42 AND REPLACE IT WITH OPEN CHANNEL.
2. IF THE DISTRICT EXERCISES ITS OPTION, THE PLAN OF TRANSITION AND DETAILS ON THIS SHEET WILL REPLACE PLAN OF TRANSITION ON SHEET NO. 9. SEE ALSO SECTION 2 B-15 IN SPECIFICATIONS.

STRUCTURAL DATA											
REINFORCING STEEL											THICKNESS
	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9	T-1	T-2
STA. 58+20.42 TO STA. 58+50.42	#5@10"	#6@10"	#7@10"	#4@16"	#5@16"	#7@16"	#4@10"	#5@10"	#5@10"	1'-3"	1'-3"
HORIZONTAL LENGTH	VARIES 20'-9" TO 21'-5"		8'-7"	5'-4"	1'-5"	1'-5"	1'-5"	VARIES 21'-3" TO 21'-11"	11'-2"	7'-8"	
VERTICAL LENGTH	VARIES 11'-5" TO 14'-2"		9'-2"	5'-8"	VARIES 11'-5" TO 14'-2"	8'-1"	5'-6"				



R.C. BOX CULVERT
RETAINING WALL II DETAIL
 NO SCALE



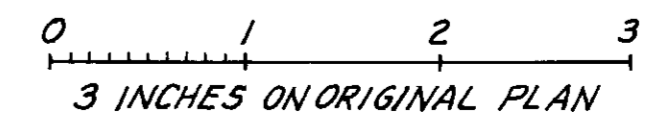
R.C. BOX CULVERT
RETAINING WALL I DETAIL
 NO SCALE

- NOTES:**
1. SPLICES IN REINF. STEEL SHALL BE 30 BAR DIA., UNLESS OTHERWISE SHOWN.
 2. ALL EXPOSED EDGES SHALL HAVE 3/4" CHAMFER.

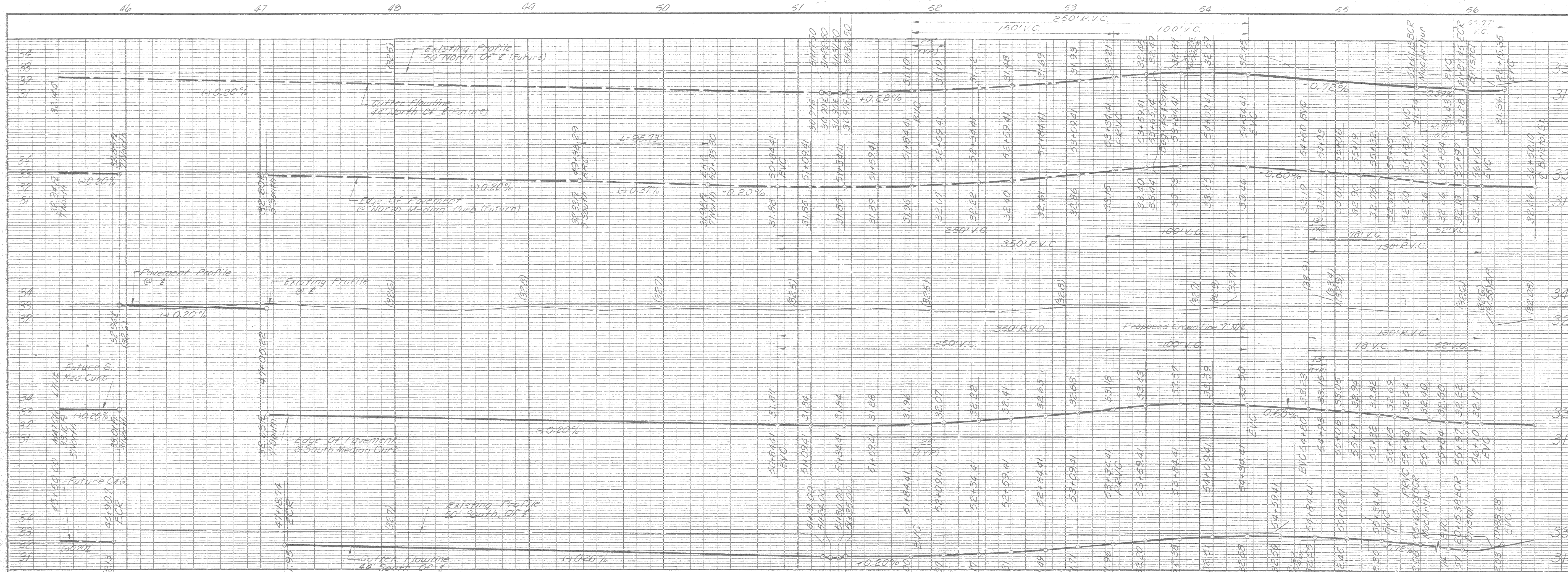
NOTE: Deleted this sheet from contract work, "As Built" 5-29-73

DATUM = O.C.F.C.D. = O.C.S. ADJUSTED 1957
 BENCH MARK NO. F2-2 ELEV. 34.70
 A SPIKE IN R.P. #599104E, ON SOUTH SIDE OF SUNFLOWER AVE, APPROX. 100' EAST OF EXISTING F.O.Z. R.C.B. AND 700' EAST OF BRISTOL STREET.

BENCH MARK NO. F2-8 ELEV. 34.87
 THE N.E. CORNER OF SQUARE MANHOLE RIM ON THE NORTH SIDE OF ALTON AVE. APPROX. 50' WEST OF F.O.Z. CHANNEL.



PRELIMINARY REVISION CODE		Disregard Prints Bearing Earlier Codes		ORANGE COUNTY FLOOD CONTROL DISTRICT	
REVISIONS				SANTA ANA-GARDENS CHANNEL	
MARK	DATE	DESCRIPTION		OPTIONAL TRANS. DETAIL AT DOWNSTREAM END OF TRIPLE 12'(W) x 10'(H) R.C.B. & RETAINING WALL DET'S.	
▲	1-74	As Built			
DESIGNED	U.G.F.	CHECKED		RECOMMENDED	
DRAWN	G.E.V.	CHECKED		RECOMMENDED	
SUBMITTED	V.T.N. ORANGE CO.	SCALE	DATE	DWG. NO.	
		AS SHOWN	MAR. 1972	F02 - 701 - 1-A	

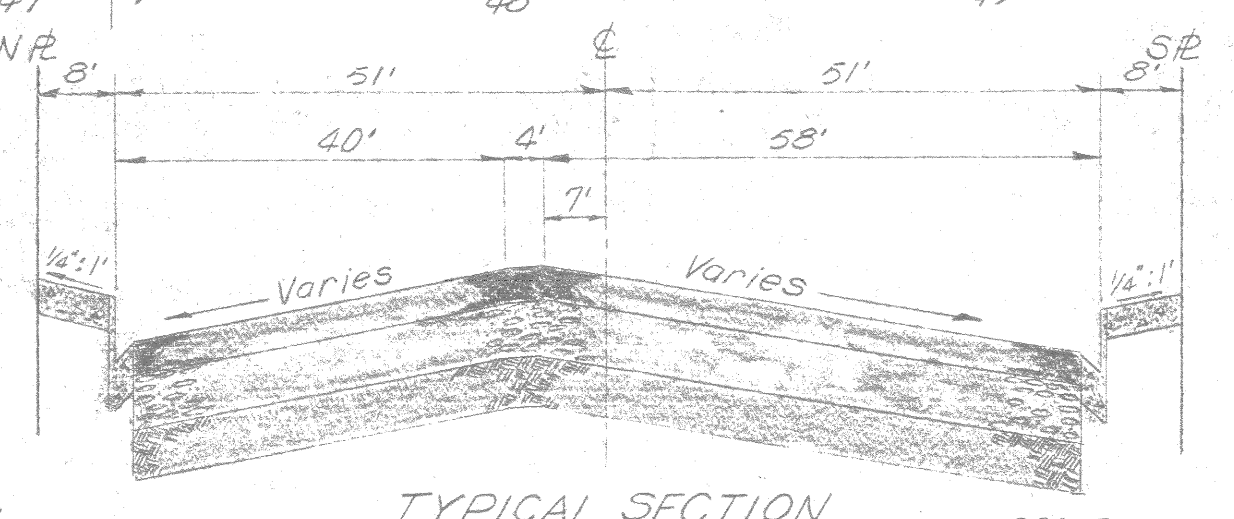


GENERAL NOTES

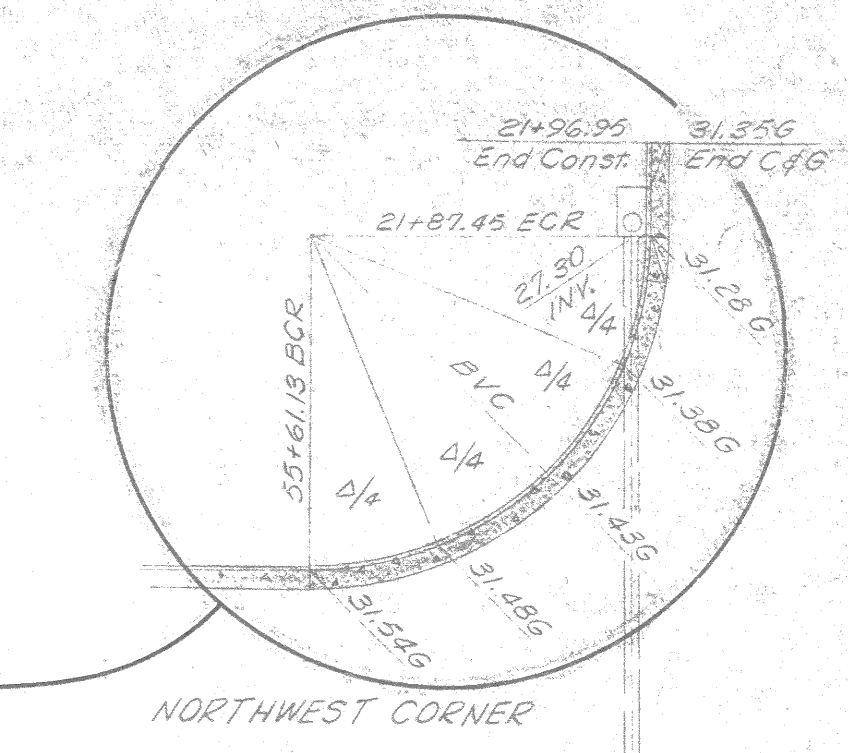
1. CONSTRUCT SHADED PORTION ONLY.
2. ALL WORK TO BE DONE IN ACCORDANCE WITH CITY OF SANTA ANA STANDARDS & SPECIFICATIONS.
3. STATIONING IS ALONG SURVEY CENTERLINE.
4. UTILITIES SHOWN ON THESE PLANS ARE CORRECT AND ACCURATE TO THE EXTENT OF AVAILABLE RECORDS AND KNOWLEDGE, THE CONTRACTOR, HOWEVER, IS REQUIRED TO TAKE STEPS TO ASCERTAIN THE EXACT LOCATION OF ALL UNDERGROUND FACILITIES PRIOR TO DOING WORK THAT MAY DAMAGE SUCH FACILITIES OR INTERFERE WITH THEIR SERVICE.
5. ALL WATER VALVE BOXES & MANHOLE RIMS SHALL BE BROUGHT TO GRADE.

CONSTRUCTION NOTES

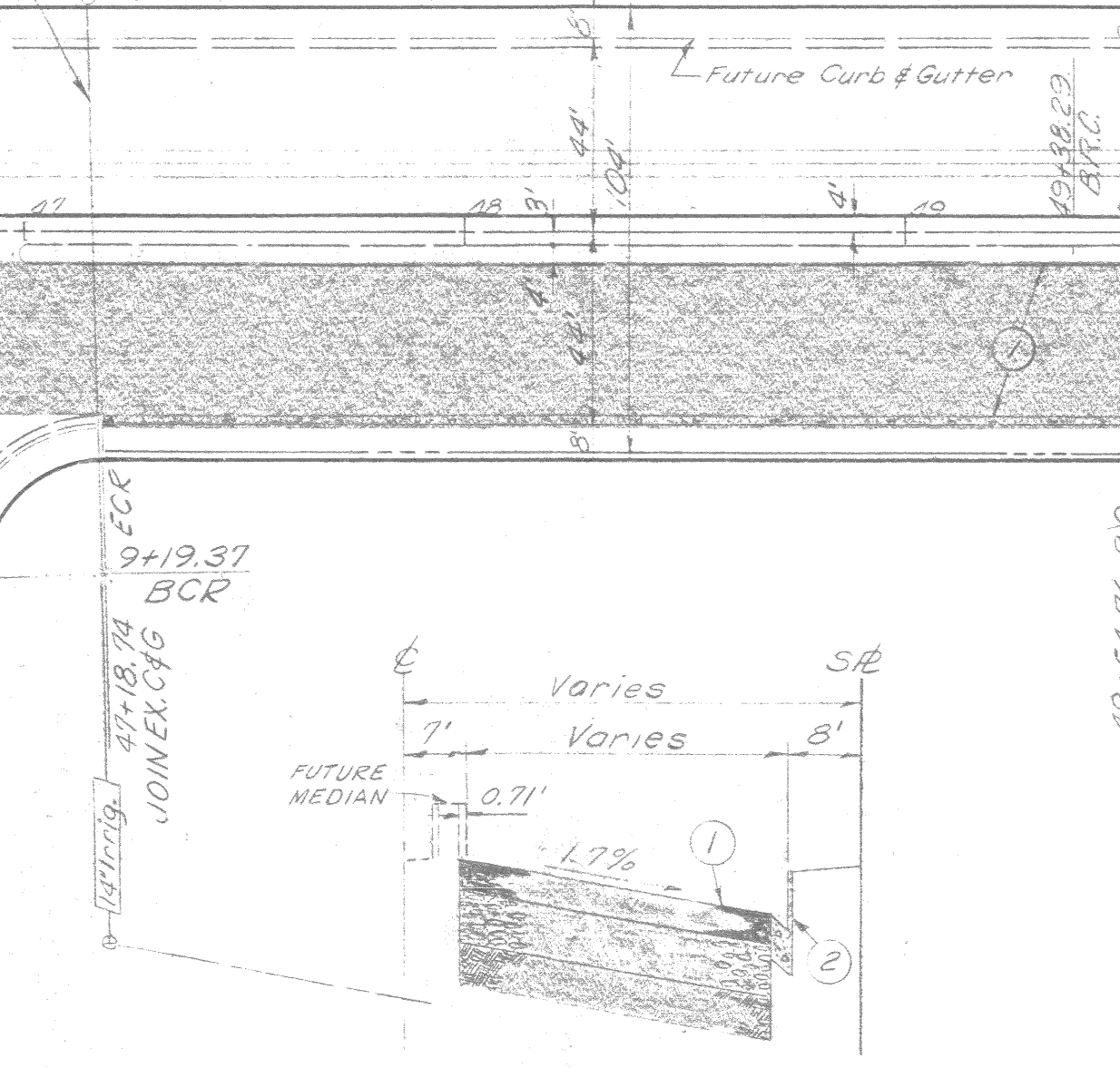
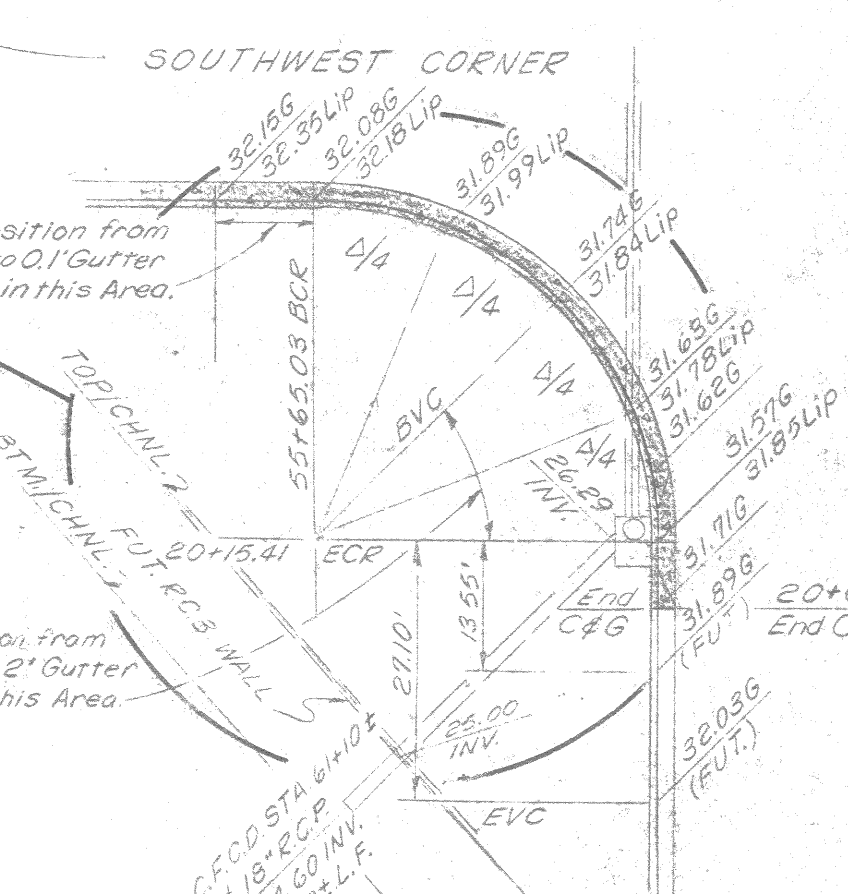
1. CONSTRUCT 4" AC, WITH FOG SEAL COAT, OVER 7" CTB OVER 6" LTS.
2. CONSTRUCT TYPE A-2 FCC CURB AND GUTTER PER STANDARD PLAN #101.
3. CONSTRUCT AC-BERM PER DETAIL, THIS SHEET.
4. CAP EXISTING PAVEMENT WITH 2" AC. JOIN & FEATHER AS DIRECTED BY ENGINEER.
5. INSTALL CHAIN LINK FENCE AS SHOWN ON PLAN.
6. INSTALL GATE, "W"-16'. SEE SHEET NO. 4.
7. CONSTRUCT FCC DRIVE APPROACH PER STANDARD PLAN NO. 112. "W" AS SHOWN.
8. CONSTRUCT CITY OF SANTA ANA SURVEY MONUMENT PER STANDARD PLAN NO. 117.
9. PLACE 3'-W21R CONSTRUCTION SIGNS, EVENLY SPACED, AT WEST END OF PAVING ON MACARTHUR BLVD. & 5' AT NORTH END OF PAVING AT PLAZA DR.



NOTE:
For Storm Drain Details
See Sheet No. 3.



See Sheet #3 for Drain Details



A.C. BERM SCALE: 1"=10'
NORTH SIDE: STA. 53+82.83 TO 54+34.39
SOUTH SIDE: STA. 52+44.10 TO 53+36.10

SIDEWALK SECTION
NORTH SIDE: STA. 53+82.83 TO 54+34.39
SOUTH SIDE: STA. 54+74.73 TO 55+31.45
UTILITIES UNDER SOUTH SIDE ONLY

CURVE DATA

Δ	R	L	T
C	10°36'32"	150'	27.77' 13.93'
D	12°11'20"	300'	63.81' 32.03'
J	88°33'45"	35'	54.10' 34.13'
K	91°26'15"	35'	55.86' 35.89'
L	91°17'54"	35'	55.77' 35.80'
M	88°42'06"	35'	54.18' 34.22'
O	12°06'05"	300'	63.86' 31.79'
P	12°06'05"	150'	31.68' 15.90'
R	12°06'05"	158'	33.37' 16.74'
S	12°06'05"	292'	61.67' 30.95'

REVISIONS

NUMBER	DATE	INITIALS	DESCRIPTION	APP'V'D.
1	9-15-72	RT	AS BUILT	

REFERENCES

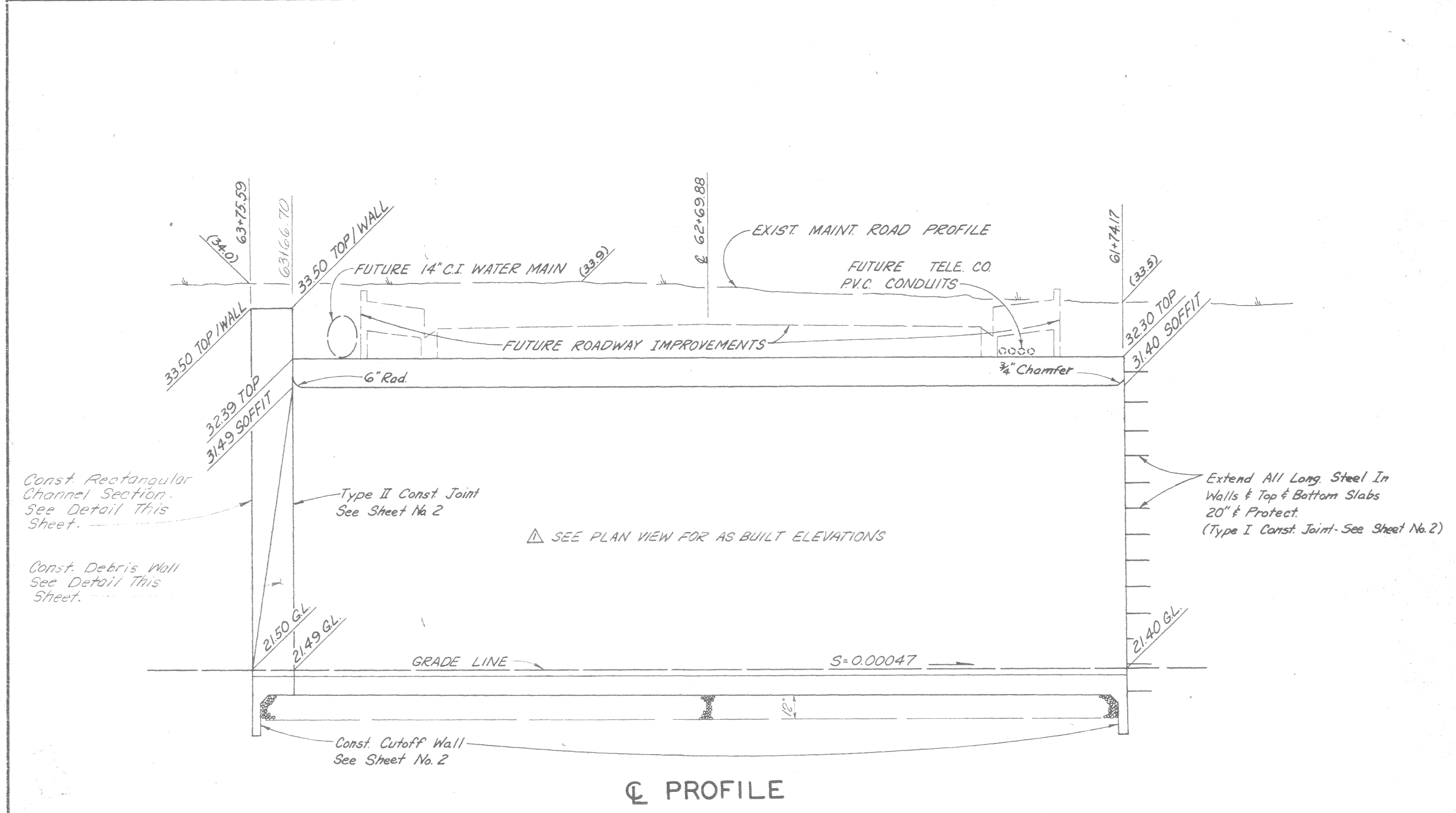
Topo.: Book LL-12, Pg. 133-138
Levels: Book LL-12, Pg. 139-144
Book LL-13, Pg. 59-62
Droy File: 1-13A-8

Bench Mark: OGS Tag So. End East Hdwl. Drain Chan'l.
Crossing Bristol Elev. 33.01
T.B.M.: Mon. E Bristol & MacArthur Elev. 31.37

SCALE: Plan: 1"=40' Profile: Horiz. 1"=40' Vert. 1"=4'

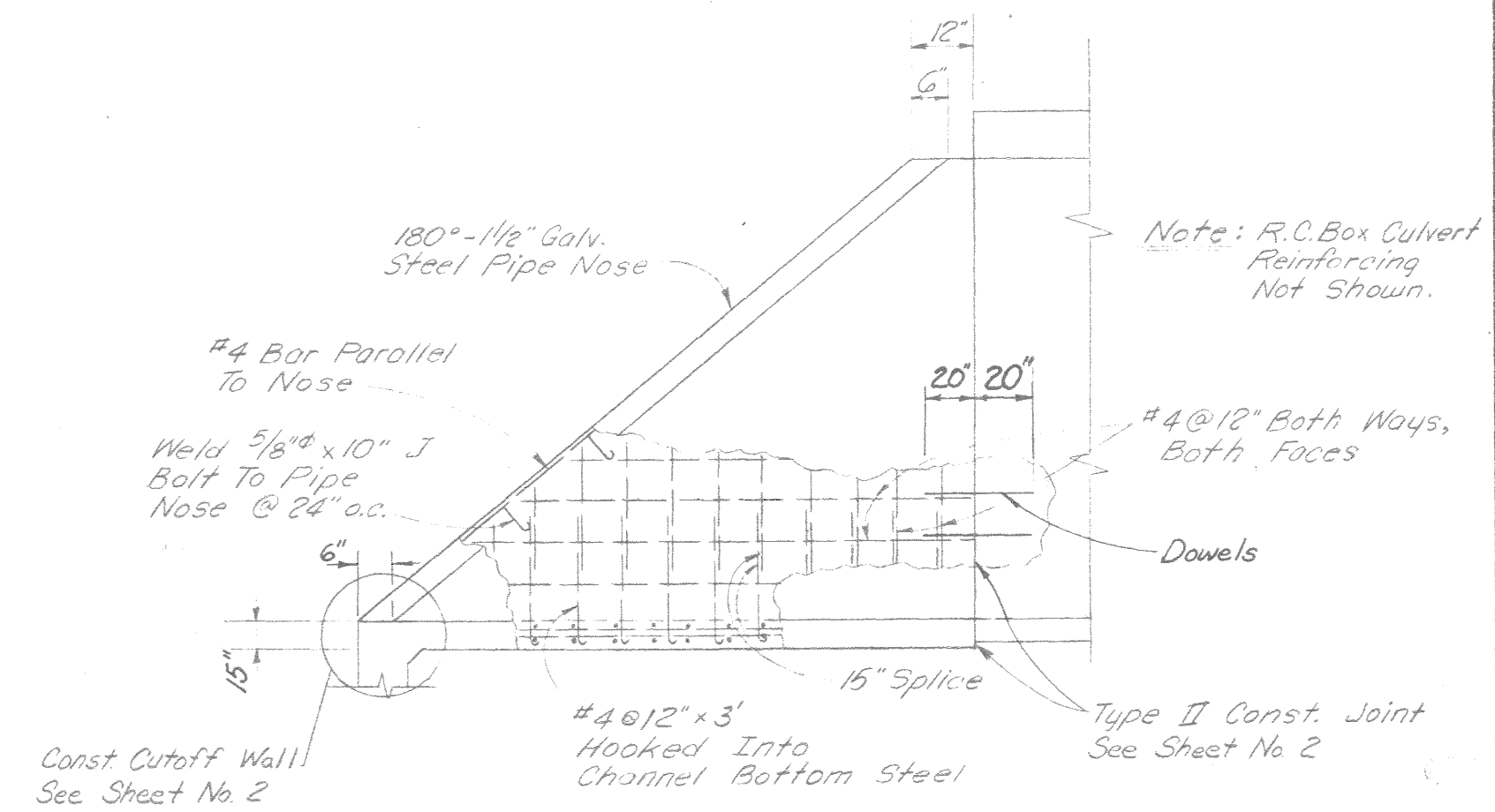
DESIGNED: BS MI 1-72
DRAWN: MA MI 1-72
CHECKED: MA RS
R/W APPROVED: MA RS 2-7-72
RECOMMENDED: J.E. Stevens 2-72
APPROVED R.C.E. NO. 9879
K. Routh & W. W. W. 2/10/72

STREET IMPROVEMENT PROJECT NO. 1327-A #1326
MACARTHUR BLVD.
PLAZA DRIVE TO BRISTOL ST.
DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA
SHEET NO. 2 OF 4



ORANGE COUNTY FLOOD CONTROL DISTRICT

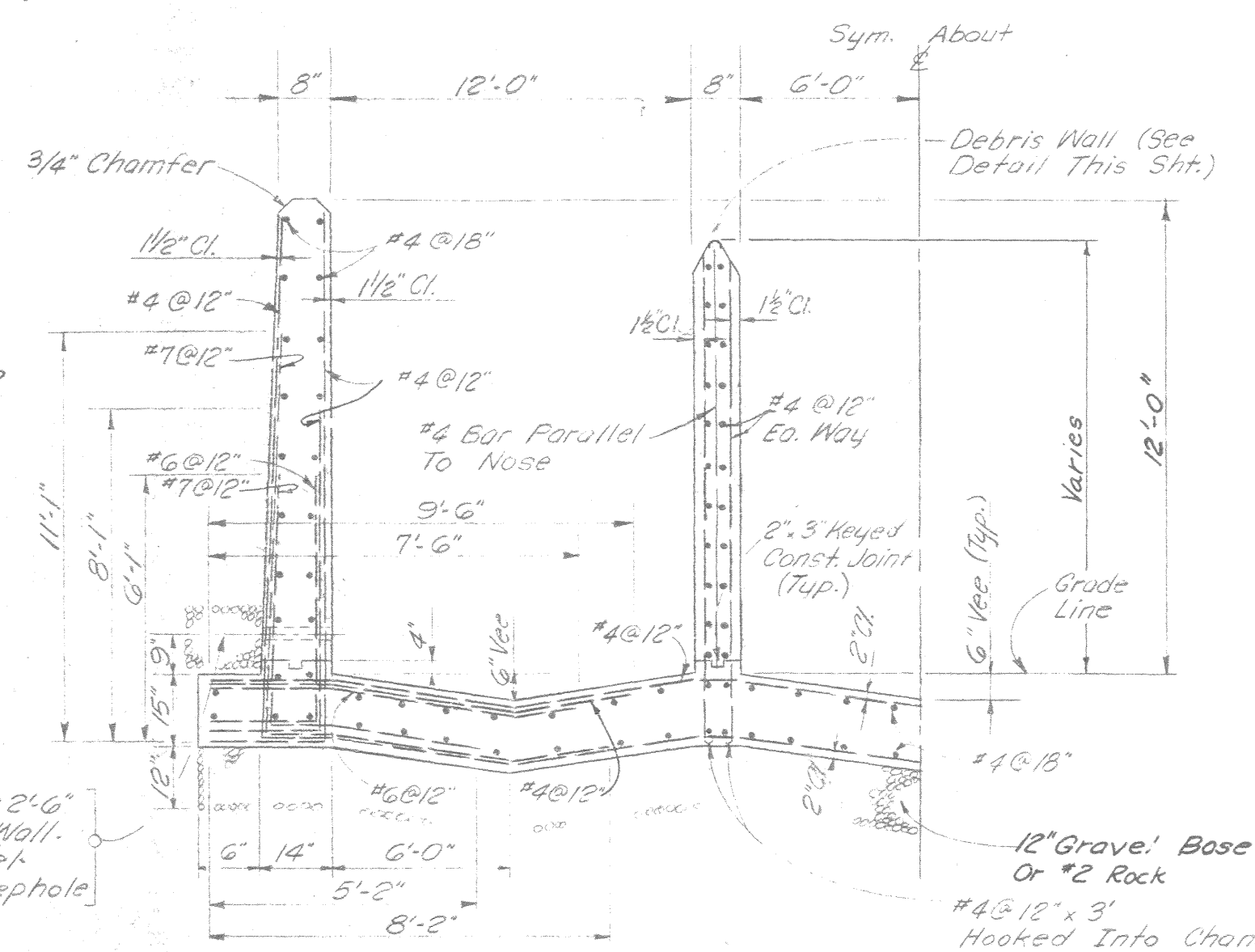
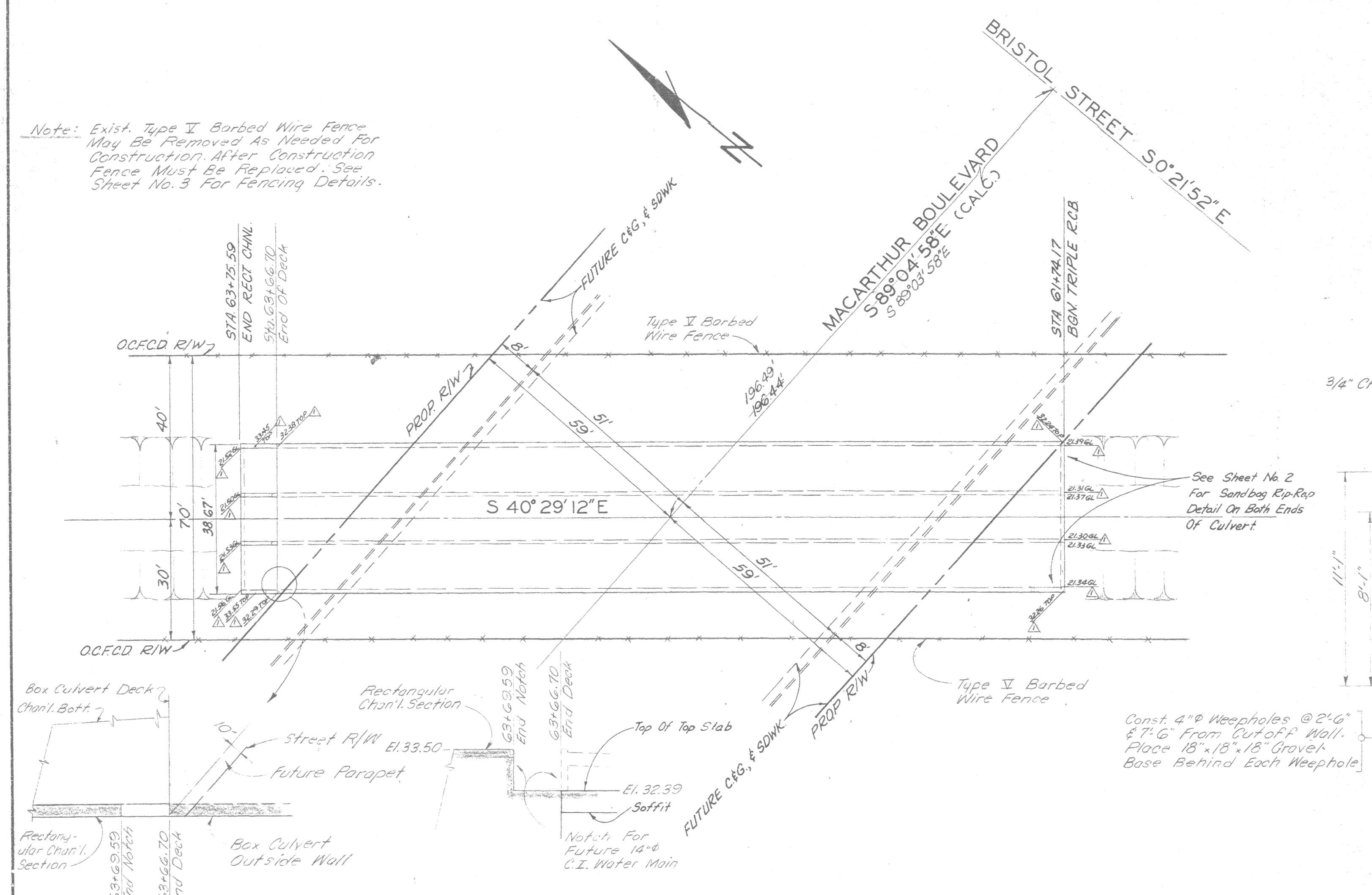
ALL WORK AND MATERIALS USED WITHIN THE FLOOD CONTROL DISTRICT RIGHT OF WAY SHALL BE IN ACCORDANCE WITH DISTRICT STANDARDS AND SPECIFICATIONS AND WITH THE PROVISIONS OF THE CONSTRUCTION PERMIT GRANTED BY DISTRICT. CONTRACTOR SHALL MAINTAIN A COPY OF SAID PERMIT AND STAMPED PLANS ON THE JOB SITE. ALL WORK AND USE OF DISTRICT PROPERTY SHALL BE SUBJECT TO CONTROL AND INSPECTION BY DISTRICT INSPECTOR.



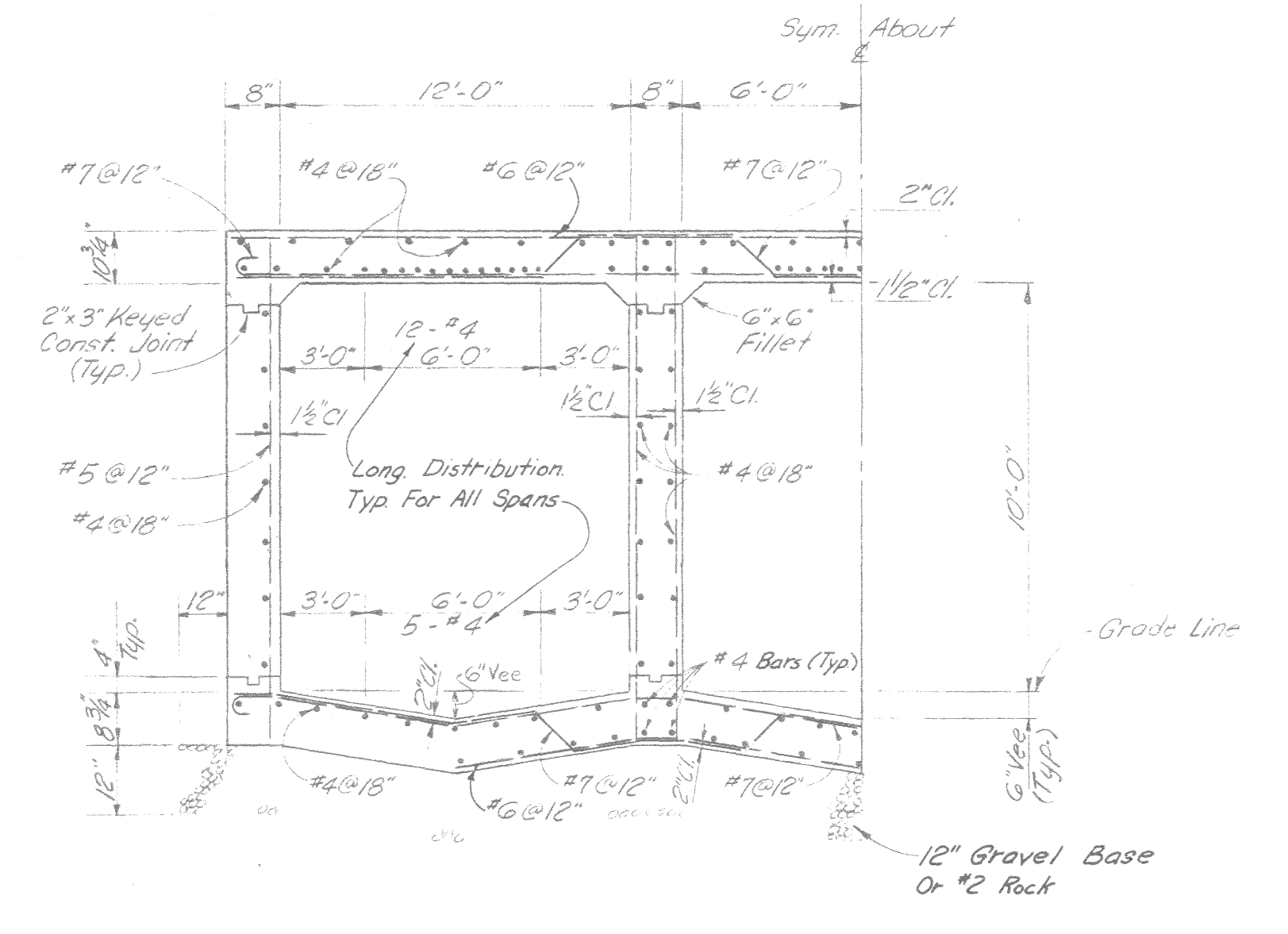
DEBRIS WALL DETAIL

- CONSTRUCTION NOTES
1. SPICES IN REINFORCING STEEL SHALL BE 30 BAR HEADSETS UNLESS OTHERWISE SHOWN.
 2. ALL EXPOSED EDGES SHALL HAVE A 3/4" CHAMFER.
 3. MINIMUM WAITING PERIOD BETWEEN ADJACENT P.C. INVERT POURS SHALL BE 1 HOUR.
 4. TRANSVERSE CONSTRUCTION JOINTS SHALL BE IN THE SAME PLANE ACROSS ENTIRE STRUCTURE.
 5. BRIDGE RUMP. BARS TO CLEAR WEERHOLE BY 1 1/2".
 6. ALL CONCRETE SHALL BE 3,000 PSI.
 7. ALL REINFORCING BARS SHALL BE PLACED SYMMETRICAL ABOUT CENTER LINE OF CULVERT.
 8. REINFORCEMENT EMBEDMENT IS 2" CLEAR, EXCEPT AS NOTED.
 9. PLACE #2 ROCK OR OTHER ENGINEER APPROVED AGGREGATE UNDER CULVERT AS DIRECTED BY ENGINEER.
 10. WHEN THE SIDEWALLS AND DECK ARE POURED SEPARATELY, THE SIDEWALLS SHALL BE POURED COMPLETELY FIRST AFTER A SUITABLE TIME TO BE DETERMINED BY THE ENGINEER (30 MINUTES MINIMUM), THE DECK MAY BE POURED.

PROFILE



TYP. HALF SECTION R.C. RECTANGULAR SECTION



TYP. HALF SECTION R.C. BOX CULVERT

REVISIONS				
NUMBER	DATE	INITIALS	DESCRIPTION	APP'D
1	11-10-71	BS	As Built	RS

REFERENCES	
SPSA-40 DWG NO 1-17-9	Bench Mark: B.M. No. SA-206.70
OC.FCD DWG NO F02-101-2-A	O.C.S. Disc. So. End East Helwall, OC.FCD Channel At Bristol Approx. 250' So. Of MacArthur & Bristol Intersection.
	1970 Adjusted Elev. = 33.328

SCALE:	NO SCALE UNLESS OTHERWISE SPECIFIED	DATE
DESIGNED	W.M. STEAFFENS	8-71
DRAWN	W.M. STEAFFENS	8-71
CHECKED	J.W. ES	
R/W APPROVED		
RECOMMENDED		
APPROVED R.C.E. NO. 11026	John Stevens	8-15-71

PROJECT NO. 1326-A

SANTA ANA GARDENS CHANNEL CROSSING
MACARTHUR BLVD.
R.C. BOX CULVERT DETAILS

DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA

SHEET NO. 1 OF 4
W.O. 48435