CITY OF RANCHO MIRAGE

69825 HIGHWAY 111
RANCHO MIRAGE, CA 92270
(760) 324-4511

REQUEST FOR PROPOSALS
FOR
INTERSECTION TRAFFIC SIGNAL
WIRE UPGRADE

Issued:
MAY 18, 2016

TABLE OF CONTENTS

CITY OF RANCHO MIRAGE

REQUEST FOR PROPOSALS FOR INTERSECTION TRAFFIC SIGNAL WIRE UPGRADE

ANNOUNCEMENT:

The City of Rancho Mirage ("City") invites proposals from qualified, competent, knowledgeable, and experienced companies that will provide full-service intersection traffic signal wire upgrade services and administer the duties and responsibilities set forth in this Request for Proposals ("RFP"), in compliance with all applicable laws, regulations, policies and procedures. Firms submitting proposals must be prepared to immediately enter into a contract ("Agreement") for the services and duties as set forth in this RFP.

The work to be accomplished includes, in general terms, all aspects of intersection traffic signal wire upgrade services.

PROPOSALS/OFFER SUBMITTAL:

Proposals will be accepted until **4:00 p.m. on JUNE 9, 2016**, and each must be submitted in a sealed envelope plainly marked on the outside **"SEALED BID FOR INTERSECTION TRAFFIC SIGNAL WIRE UPGRADE - DO NOT OPEN WITH REGULAR MAIL"** to:

The City of Rancho Mirage
Attn: Mark W. Sambito, Director of Public Works
69825 Highway 111
Rancho Mirage, California 92270

SCOPE OF SERVICES:

The selected firm shall provide to the City all the necessary services to fulfill its duties and obligations under the Agreement which duties and obligations include but are not limited to, the following:

WORK DESCRIPTION-REWIRING TRAFFIC SIGNAL COMPONENTS

Contractor shall put intersection in red flash manually through the switch inside the traffic signal cabinet and turn the controller off through the adjacent controller power switch located inside the cabinet on the door. Once the intersection is in red flash, the CONTRACTOR shall set up traffic control items mentioned in the traffic requirement section. The CONTRACTOR shall remove all wiring from the traffic signal cabinet to

each component that it is powering. Conduits shall be cleared of all debris using a compressor to force air through conduit. Air shall NOT be used to force air into the signal cabinet, or the traffic signal poles. All conduits shall have new bonding caps installed on all conduit terminations with new bonding wire making connections. Belden approved signal cable shall be installed in all locations. All signal cable shall be pulled as a continuous run without the use of machinery. Pull eze wire lubricant may be used to help facilitate the wire pull. Each pull box shall contain a minimum of 3 feet of slack for all signal cable and wire installed. The slack shall be the same for each wire and shall be coiled evenly in the pull box to minimize stress on the wire when recessed in the box. The long and short leg shall be a standard wire pull as seen on existing signal plans with terminations from the signal cabinet to its corresponding signal gear. The wire in the cabinet shall be neat, using 90 degree angles when bending wire to its required destination. Color coding and phase selection shall be determined by city inspector. Existing Loop wires will be used and will be spliced into the new DLC wire. The new DLC shall terminate at the proper location on the loop interface panel. All cabinet wiring shall be neat and labeled numerically according to the proper phase that it is connected to. Luminaire and iisns wire shall be pulled from the service to each corresponding location on the mast arm. LMR-400 wire shall be installed to the antennae locations noted on the attached traffic signal modification plans **(Exhibit "A")**. Christys Fiberlyte pull box lids shall be installed in place of ALL existing concrete pull box lids. There are 35 #5 lids, and 18 # 6 lids. Upon final inspection from the City of Rancho Mirage's signal inspector, the signal shall be returned to flash state, the barricades shall be picked up, and the intersection shall be returned to normal operation.

The Traffic Signal Modification Plans are attached hereto and incorporated herein by this reference as **Exhibit "A."**

WORK LOCATIONS ON TRAFFIC SIGNAL MODIFICATION PLANS

The intersection of Bob Hope @ Rancho Las Palmas

The intersection of Frank Sinatra @ Morningside/Thompson

The intersection of Gerald ford @ Los Alamos/ Inverness

WORK COMPLETION

Contractor shall complete one intersection per work day and work must be completed on or before June 30, 2016.

TRAFFIC REQUIREMENTS

Contractor must furnish and display 3 stop signs (R1-1) **(MUTCD, Sign Chart, see Exhibit "B")** in each direction while intersection is in red flash or dark. The stop signs must be a minimum of 30" with a Caltrans approved retro reflectivity rating, **(MUTCD,**

Chapter 2A, Section 2A.07 and 2A.08, see Exhibit "C"). The stop signs shall be installed and secured on type 2 barricades equipped with flashing red beacons. One sandbag shall be used to stabilize the barricade once it is installed. In addition to the stop signs, there shall be one advance stop ahead sign (W3-1) **(MUTCD, Sign Chart, Exhibit "B")** at each intersection approach used as advance notification.

SUBMITTALS

All wiring must meet Belden approved specifications **(Belden IMSA Catalog, see Exhibit "D")** and be approved by the City of Rancho Mirage prior to purchase. All material used must have submittals signed off. That includes: 12 conductor signal cable (14 awg), 5 conductor signal cable (14 awg), 3 conductor signal cable (14awg), DLC, LMR-400 radio cable, common wire (10 awg), iisns wire red (12 awg), luminaire wire black (10 awg), bonding caps for conduit and fiberlyte pull box lids.

GENERAL INSTRUCTIONS FOR SUBMITTAL:

A. Proposal Submittal:

The proposer shall submit one (1) original and three (3) copies by **4:00 p.m. (Pacific Standard Time), JUNE 9, 2016, to:**

The City of Rancho Mirage
Attn: Mark W. Sambito, Director of Public Works
69825 Highway 111
Rancho Mirage, California 92270

B. Due Date and Time:

Proposals submitted after **4:00 p.m. on JUNE 9, 2016**, may, at the sole discretion of the City, be rejected as non-responsive and returned without review. For a proposal to be considered on time, it must be date stamped by City staff upon receipt. At the discretion of the City, a "late" proposal may be considered only if a selection cannot be determined from among proposals received on time. The City shall not be responsible for, nor accept any as a valid excuse, any delay in mail service, or any other method of delivery used by the proposer. All proposals shall be enclosed in a sealed envelope with the words clearly written on the front, "**SEALED BID FOR INTERSECTION TRAFFIC SIGNAL WIRE UPGRADE - DO NOT OPEN WITH REGULAR MAIL.**" Failure of the proposer to properly identify the sealed envelope proposal as described may result in the proposal being considered non-responsive. All proposals shall be firm offers subject to acceptance by the City and may not be withdrawn for a period of 180 calendar days following the last day to accept proposals. Proposals may not be amended after the due date except by consent of the City. All proposals must clearly address all of the requirements outlined in this RFP. Each proposal shall be limited to twenty (20) pages and must include a minimum of three (3) references, which include the address,

telephone number, and email address of each reference. Resumes and brochures may be added to the proposal, provided they are located in an appendix at the back of the proposal. Should the proposer have concerns about meeting any noted requirements, the proposer shall include a clearly labeled subsection with individual statements specifically identifying the concerns and exceptions.

C. RFP Addenda and Clarifications in Written Comments

All comments and questions from proposers must be submitted in writing and received by no later than **4:00 p.m. on Thursday, JUNE 2, 2016** ("Addenda Due Date"), and must be submitted via the following approved written methods addressed to Mark W. Sambito, Director of Public Works:

1. At marks@RanchoMirageCA.gov, or

2. Via fax to (760) 770-3261, or

3. Via mail, as long as the correspondence is received and date stamped by the City on or prior to the Addenda Due Date.

Submittal of written comments or questions shall not be considered by the City unless submitted in an approved method on or before the Addenda Due Date. Written comments or questions received via approved method and within the time prescribed herein will be addressed by the City's issuance of an addendum. Notwithstanding anything else herein, if it becomes necessary for the City to revise any part of this RFP, or to provide clarification or additional information after this RFP has been issued, a written addendum will be sent to each recipient of record. Recipients of record shall consist of proposers on the original "bidders" mailing list, or proposers that have requested RFPs and have provided pertinent contact information in writing to the City. Addenda will also be posted and published on the City's website, http://www.ranchomirageca.gov, as well as everywhere else the RFP was originally posted and published. Though the City shall mail out any addenda to RFP recipients of record, and in addition will post any addenda information on the City website and publish and post in accordance with the above, as soon as it becomes available, it shall be the responsibility of the proposers to maintain current, up to date contact information with the City if any addenda are to be mailed. All addenda shall become part of the RFP.

D. Pre-contractual Expenses:

The City shall not be responsible for, under any circumstances, any claims of expenses necessary for the proposer to receive, evaluate, complete and deliver the proposal. The proposer should also not include any pre-contractual expenses or fees in the proposal.

E. Conflicts of Interest:

The proposer affirms that to the best of his or her knowledge, there exists no actual or potential conflict between the firm's business or financial interests, and either the services to be provided under the Agreement, or any commissioner, officer, employee, or agent of the City. For the duration of the Agreement, the proposer shall refrain from undertaking any work for any individual, business, or legal entity, in which direct conflicts of interest regarding the services to be provided thereunder or herein may arise.

F. Proposed Contract:

The proposer selected through this RFP shall be required to enter into the Agreement with the City, a form of which is attached hereto as **Exhibit "E."**

G. Prevailing Wages

The selected firm shall be required to pay prevailing wages in accordance with the State Labor Code. Compliance with the prevailing rates of wages and apprenticeship employment standards established by the State Department of Industrial Relations will be required.

H. Notice Regarding Registration with Department of Industrial Relations

1. No contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

2. No contractor or subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

3. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

I. Insurance and Acknowledgement

Each proposal shall include a breakdown of all costs associated with issuance of the insurance endorsements described in and pertaining to Sections 4 and 5 of the Agreement ("Insurance Provisions"). Each proposal shall also include signed acknowledgement(s) in substantially the same form as the form attached hereto as

Exhibit "F," through which each insurance carrier that will issue any policy required in the Insurance Provisions, shall acknowledge, warrant and represent that it possesses the ability to and shall furnish all the insurance endorsements prescribed in the Insurance Provisions within thirty (30) days after the date of contract award.

J. Bonds

If the cost of the project should exceed $25,000, the selected bidder will be required to post a payment bond and performance bond.

PROPOSAL FORMAT AND CONTENT:

A. Presentation

Proposals shall be submitted in an 8 ½" x 11" format, fastened with an effective method.

B. Proposal Content

1. Transmittal Letter

   a. Contact information, identification of firm, name and email address and telephone number

   b. A statement to the effect that the proposal will remain valid for 180 days from the due date for the proposals

   c. Acknowledgement of receipt of addenda, if any

   d. Signature of the person authorized to bind the terms of the proposal

2. Table of Contents

   Following the transmittal, provide a table of contents for the proposal

C. Qualifications, Related Experience and References

1. This section shall establish the ability of the proposer to satisfy all aspects of the required work with current or recently completed traffic signal wire upgrade services work, similar to the work required in this RFP.

2. Background information of the proposer, including the date of founding, legal form, number and location of offices, number of employees, days and hours of operation and any other pertinent information.

3. Disclose any conditions (e.g., bankruptcy, pending litigation, planned office closures, mergers) and organizational conflicts of interest that may affect the ability of the proposer to perform the required duties.

4. Certify that the proposer is not debarred, suspended or otherwise declared ineligible to contract with any other federal, state or local public agency.

5. Provide a list of business clients to which you or your company is currently providing, or has recently provided, traffic signal wire upgrade services similar to those required in this RFP. Include company names, beginning/end dates of contracts, and names, titles and telephone numbers the City can contact as references for you or your company.

D. Proposed Staffing and Project Organization

1. Discuss the staffing of the proposing firm who would be assigned to work on the City's project.

2. Identify the key personnel that would be assigned to the project, in hours per week. Include a brief description of their qualifications and experience in performing the type of work being assigned.

3. Designate an administrator who would serve as a day-to-day contact for the City.

4. Provide any necessary organizational chart of the firm as it relates to this RFP.

E. Work Plan / Technical Approach

1. Establish the proposer's understanding of the City's objectives and requirements, demonstrate the proper ability to meet those objectives and requirements, and clearly identify the method (plan) of accomplishing the described work.

2. Describe what information, documentation or staff assistance from the City your firm would request from the City in order to complete the work described.

F. Cost and Price

1. This section shall disclose all charges to be assessed the City for the required services and declare the proposer's preferences for method and timing of payment.

2. Quote a total price for completing all services; include all costs associated with the operating budget, including all construction service fees. The total cost should also include the cost associated with obtaining a payment bond and performance bond, and all required insurance coverages.

G. Appendices

Furnish as appendices, supporting documentation as requested, such as financial information and staff resumes.

AWARD OF CONTRACT:

Following a review of the proposals, the City shall determine whether to award the contract to a particular bidder or to reject all proposals. The award of contract, if made, shall be to the lowest responsible and responsive bidder as determined solely by the City. At the time of contract award, the successful bidder **shall hold a current and active Class C-10 Contractor's License issued by the State of California, as required to perform the work and IMSA Level 2 Certification.** Additionally, the City reserves the right to reject any or all proposals, and to accept any bid or portion thereof, to waive any irregularity in the offers received, all as may be required to provide for the best interests of the City. In the event of any such rejection, or in the event a proposer's offer is not rejected but does not result in contract award, the City shall not be liable for any costs incurred by the proposer in connection with the preparation and submittal of the proposal. In no event will an award be made until all necessary investigations are made as to the responsibility and qualifications of the bidder to whom the award is contemplated.

[REMAINDER OF PAGE LEFT INTENTIONALLY BLANK]

EXHIBIT "A"

TRAFFIC SIGNAL MODIFICATION PLANS

ATTACHED

CONDUCTOR AND CONDUIT SCHEDULE

AWG OR CABLE	CONDUCTOR RUN	1	2	3	4	5	6	7	8	9	10
#14	#1	-	-	-	3	3	3	3	-	3	3
	#2	3	3	3	3	3	3	3	-	3	3
	#3	-	-	-	-	-	-	-	-	-	-
	#4	-	3	3	3	3	3	3	3	6	6
	#5	3	3	3	3	3	3	3	3	6	6
	#6	-	-	-	-	-	3	3	-	3	3
	#7	-	-	-	-	-	-	-	-	-	-
	#8	-	-	-	-	-	-	-	-	-	-
	#2P	2	2	2	2	2	2	2	-	2	2
	#4P	-	2	2	2	2	2	2	-	2	2
	#6P	-	-	-	-	-	2	2	2	4	4
	#8P	-	-	-	-	-	-	-	-	-	-
	#2PPB	-	1	1	1	1	1	1	-	1	1
	#4PPB	1	1	1	1	1	1	1	1	2	2
	#6PPB	-	-	-	-	-	-	1	-	1	1
	#8PPB	-	-	-	-	-	-	-	-	-	-
	PPB COMMON	1	1	1	1	1	1	1	1	1	1
	SPARES	3	3	3	3	3	3	3	3	3	3
	TOTAL #14	13	19	19	22	22	27	28	13	37	37
#12	I.I.S.N.S.	2	2	2	2	2	2	2	-	2	-
#10	LUMINAIRES	2	2	2	2	2	2	2	-	2	-
	SIGNAL COMMON	1	1	1	1	1	1	1	1	2	2
	TOTAL #10	3	3	3	3	3	3	3	1	4	2
#6	SIGNAL SERVICE	-	-	-	-	-	-	-	-	-	3
DLC	#1 DETECTORS	-	-	-	-	-	-	-	1	1	1
	#2 DETECTORS	-	-	-	2	2	2	2	-	2	2
	#3 DETECTORS	-	-	-	-	-	-	-	-	-	-
	#4 DETECTORS	-	2	2	2	2	2	6	-	6	6
	#5 DETECTORS	-	-	-	-	1	1	1	-	1	1
	#6 [illegible]	-	-	-	-	-	-	-	2	2	2
	#7 [illegible]	-	-	-	-	-	-	-	-	-	-
	#8 DETE[illegible]	-	-	-	-	-	-	-	-	-	-
	TOTAL DLC	-	2	2	4	5	5	9	3	12	12
OPTICOM		1	1	2	2	2	3	3	-	3	3
CONDUIT SIZE		2"(E)	2½"(E)	2½"(E)	2½"	2½"	2½"	3"	2"	2-3"	2-3"

(E) - EXISTING CONDUIT

CONSTRUCTION NOTES

[1] INSTALL TYPE 90 (TRACONEX TMP-390) CONTROLLER ASSEMBLY IN A TYPE "P" CABINET. PROVIDE 3M PHASE SELECTOR MODEL 262 FOR EMERGENCY VEHICLE PREEMPTION SYSTEM.

[2] INSTALL TYPE III-CF, 120/240V DUAL-METERED SERVICE, WITH A 100-AMP MAIN CIRCUIT BREAKER, A 50-AMP SIGNAL BREAKER, A 30-AMP LUMINAIRE BREAKER, AND A 15-AMP I.I.S.N.S. BREAKER. PROVIDE TWO TYPE V P.E. CONTROL UNITS WITH TEST SWITCHES, ONE FOR I.I.S.N.S. AND ONE FOR LUMINAIRES.

[3] INSTALL 3M OPTICOM DETECTOR MODEL M-511 ON SIGNAL MAST ARM. SEE OPTICOM INSTALLATION DETAIL.

GENERAL NOTES

1. TRAFFIC SIGNAL AND LIGHTING SHALL CONFORM TO THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS SECTION 86 AND STANDARD PLANS (DATED JAN. 1988).
2. LOCATION OF ALL UNDERGROUND UTILITIES ARE APPROXIMATE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATIONS AND VERIFY ALL CONDITIONS ON THE JOB SITE. HAND DIG FOUNDATIONS UNTIL CLEAR OF OBSTRUCTIONS. PHONE UNDERGROUND SERVICE ALERT AT 800/422-4133 48 HOURS PRIOR TO EXCAVATING.
3. ALL LOOPS SHALL BE 6'x 6' WITH 10' SPACING IN THE DIRECTION OF TRAVEL AND CENTERED IN THE LANE EXCEPT AS SHOWN. EXTEND LIMIT LINE LOOPS 2' INTO CROSSWALK OR PAST LIMIT LINE.
4. ALL VEHICLE INDICATIONS SHALL BE 12", PULLBOXES NO.5, AND CONDUIT 2" RIGID METAL, EXCEPT AS SHOWN.
5. FOR COMPLETE SIGNING AND STRIPING INFORMATION, SEE SHEET T6 OF 7.
6. OBTAIN APPROVAL FOR EXACT EQUIPMENT LOCATIONS PRIOR TO FINAL PLACEMENT. PERFORM STRIPING REVISIONS PRIOR TO LOOP DETECTOR LAYOUT.

POLE SCHEDULE

NO	STANDARD DESCRIPTION	SIG.M.A.	LUM.M.A.	LUMINAIRE H.P.S.V.	I.I.S.N.S. LEGEND	SIGNAL MTG. MA	SIGNAL MTG. POLE	SIGNAL MTG. PED.*	PED.PUSH BTN TYPE	PED.PUSH BTN PHASE	POLE LOCATION A	POLE LOCATION B
1	26-4-80 (N)	45' (N)	15' (N)	250W (N)	CIVIC CENTER DR ⟶ (N)	[illegible]	SV-1-T(N)	SP-1-T(R)	B (R)	4	11'	2.5'
2	1-A (N)	-	-	-	-	-	TV-1-T(N)	SP-1-T(R)	B (R)	8	15'	2.5'
3	17-2-80 (R)	20' (R)	15' (R)	250W (R)	BOB HOPE DR(R)	MAT(R)	SV-1-T(N)	SP-1-T(R)	B (R)	8	10'	2.5'
4	1-A (R)	-	-	-	-	-	TV-1-T(N)	SP-1-T(R)	B (R)	4	15'	2.5'
5	26-4-80 (E)	40' (E)	15' (E)	250W (E)	⟵ CIVIC CENTER DR (N)	[illegible]	SV-1-T(N)	SP-1-T(E)	B (E)	4	SEE PLAN	
6	1-A (E)	-	-	-	-	-	TV-1-T(N)	SP-1-T(E)	B (E)	2	SEE PLAN	
7	17-2-80 (E)	20' (E)	15' (E)	250W (E)	BOB HOPE DR(E)	MAT(E)	SV-1-T(N)	SP-1-T(E)	B (E)	2	SEE PLAN	
8	1-A (E)	-	-	-	-	-	TV-1-T(N)	SP-1-T(E)	B (E)	4	SEE PLAN	

(N) - NEW EQUIPMENT
(R) - RELOCATED EQUIPMENT
(E) - EXISTING EQUIPMENT
* - USE CLAMSHELL MOUNTING HARDWARE FOR PEDESTRIAN SIGNAL MOUNTING. SEE CALTRANS STANDARD PLAN ES-3E.

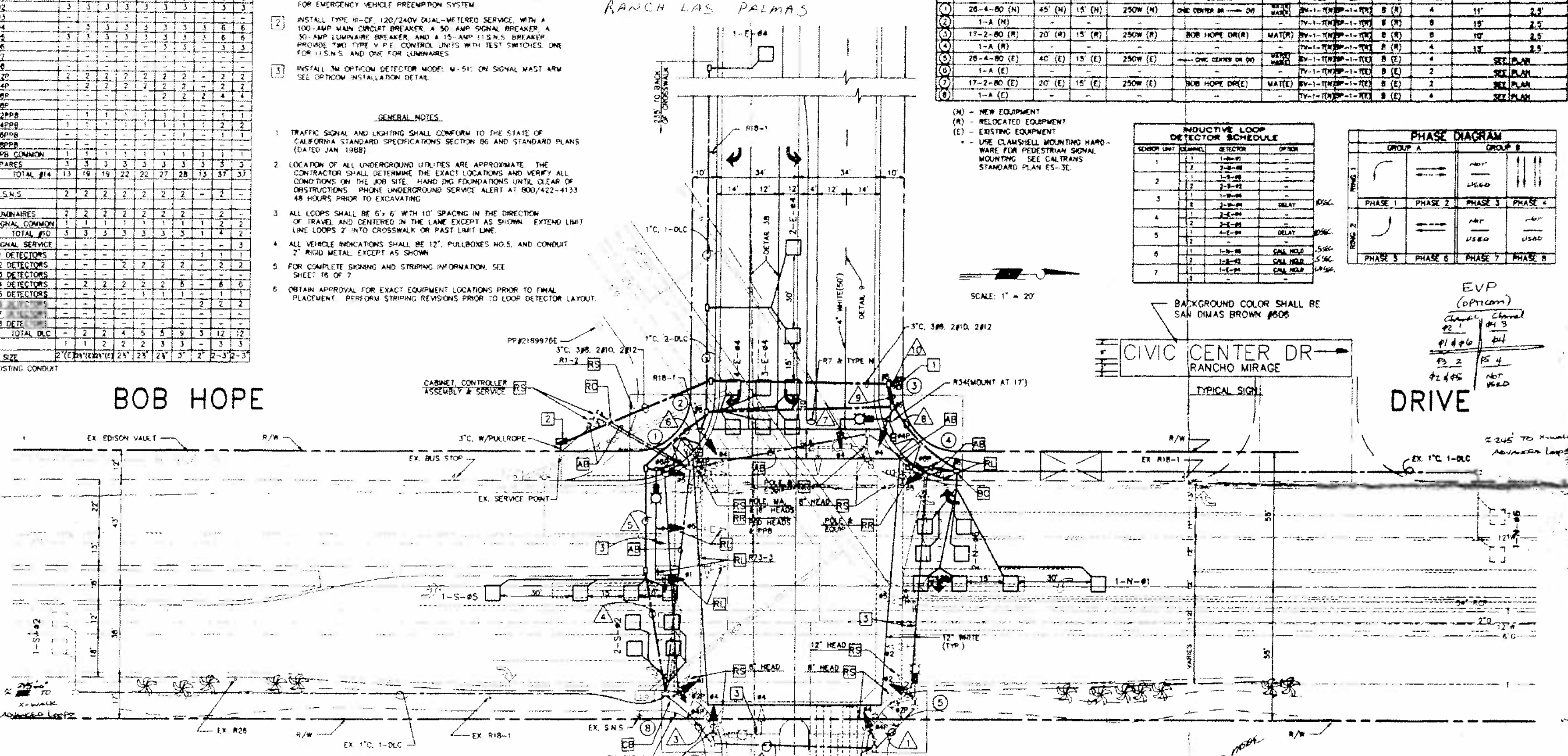
INDUCTIVE LOOP DETECTOR SCHEDULE

SENSOR UNIT	CHANNEL	DETECTOR	OPTION
1	1	1-N-Ø1	-
	2	2-N-Ø8	-
2	1	1-S-Ø5	-
	2	2-S-Ø2	-
3	1	1-W-Ø4	-
	2	2-W-Ø4	DELAY 10SEC.
4	1	2-E-Ø4	-
	2	3-E-Ø4	-
5	1	4-E-Ø4	DELAY 10SEC.
	2	-	-
6	1	1-N-Ø6	CALL HOLD .5SEC.
	2	1-S-Ø2	CALL HOLD .5SEC.
7	1	1-E-Ø4	CALL HOLD 1.0SEC.
	2	-	-

PHASE DIAGRAM

	GROUP A		GROUP B	
RING 1	PHASE 1	PHASE 2	PHASE 3 NOT USED	PHASE 4
RING 2	PHASE 5	PHASE 6	PHASE 7 NOT USED	PHASE 8 NOT USED

SCALE: 1" = 20'

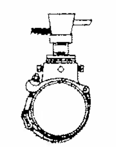


BACKGROUND COLOR SHALL BE SAN DIMAS BROWN #606

CIVIC CENTER DR
RANCHO MIRAGE

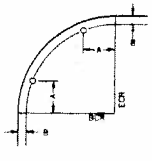
TYPICAL SIGN

EVP (opticom)
Chan 1 #2 1 — Chan 2 #1 3
#1 #46 — Ø4
#3 2 — #5 4
#2 #45 — Not used

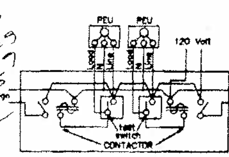


OPTICOM M-511 DETECTOR INSTALLATION DETAIL
N.T.S.

Phase Diagram in Field
Opper



STANDARD POLE LOCATION DETAIL
(N.T.S.)



TYPE V PHOTOELECTRIC CONTROL WIRING DIAGRAM

3rd Pole Pg 0 Phase 9 Int 7 5 Dark Sign Even

OFFICIALLY APPROVED
CITY OF RANCHO MIRAGE
Public Works Dept.

Signal to be operating with this plan by 1-1-93

OFFICIALLY APPROVED
CITY OF RANCHO MIRAGE
Public Works Dept.

REGISTERED PROFESSIONAL ENGINEER — EARL T. McARTHUR — No. C 044352 — Exp. 6/30/93 — CIVIL — STATE OF CALIFORNIA

REVISIONS				REFERENCES
NO	DATE	INT	APRV'D	

ASL Consultants, Inc.
ONE JENNER STREET
SUITE 200
IRVINE, CA 92718
(714) 727-7099

DESIGNED	PK	DRAFT	GJB
CHECKED	PK	DATE	7/92

PREPARED UNDER THE SUPERVISION OF:
EARL T. McARTHUR — DATE 07/06/92
R.C.E. 44352
EXP. 6-30-93

APPROVED BY:
7-7-92
R.C.E. 23561 — EXP. 12-31-92 — DATE
CITY ENGINEER

TRAFFIC SIGNAL MODIFICATION PLAN
BOB HOPE DRIVE AND ~~CIVIC CENTER DRIVE~~ RANCHO LAS PALMAS
CITY OF RANCHO MIRAGE

DWG. NO.
SHEET T3 OF 6

TRAFFIC SIGNAL PLAN
FRANK SINATRA DR. AND THOMPSON RD.
CITY OF RANCHO MIRAGE

CONDUCTOR TABLE										
AWG	CIRCUIT	RUNS 1	2	3	4	5	6	7	8	9
#14	φ1	–	–	–	3	3	–	–	3	3
	φ2	–	–	–	–	3	3	3	8	8
	φ4	–	–	3	3	3	–	3	8	8
	φ5	3	3	3	3	3	3	3	8	8
	φ6	3	3	3	3	3	–	–	3	3
	φ8	–	3	3	3	3	–	3	6	6
	φ2 PED	–	–	–	–	2	2	2	4	4
	φ4 PED	–	–	2	2	2	–	–	2	2
	φ6 PED	2	2	2	2	2	–	–	2	2
	φ8 PED	–	2	2	2	2	–	2	4	4
	φ2 PPB	–	–	–	–	–	–	1	1	1
	φ4 PPB	–	–	–	1	1	–	–	1	1
	φ6 PPB	–	1	1	1	1	–	–	1	1
	φ8 PPB	1	1	1	1	1	1	1	2	2
	PPB COMMON	1	1	1	1	1	1	1	2	2
	SPARES	3	3	3	3	3	3	3	6	6
	TOTALS	[illegible]	18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	55
DLC	φ1 DETECTOR	1	1	1	1	1	–	–	1	1
	φ2 DETECTOR	–	–	–	–	2	–	–	2	2
	φ4 DETECTOR	–	–	4	4	4	–	–	4	4
	φ5 DETECTOR	–	–	–	–	1	–	–	1	1
	φ6 DETECTOR	2	2	2	2	2	–	–	2	2
	φ8 DETECTOR	–	–	–	–	–	–	4	4	4
	TOTAL CABLES	3	[illegible]	7	7	10	–	4	14	14
#10	LUMINAIRE	–	2	2	2	2	2	2	2	–
	SIGNAL COMMON	1	1	1	1	1	1	1	2	2
	TOTAL	1	3	3	3	3	3	3	4	2
#12	I.S.N.S.	–	2	2	2	2	2	2	2	–
	CONDUIT SIZE	2"	2"	2"	2 1/2"	3"	2"	2"	2-3"	2-3"

* NEW CONDUIT
** EXISTING CONDUIT

[illegible] DETECTOR SCHEDULE			
SENSOR UNIT	CHANN	DETECTOR	OPTION
1	1	[illegible]	–
	2	[illegible]	DELAY
	3	[illegible]	–
	4	[illegible]	DELAY
2	1	[illegible]	–
	2	[illegible]	–
	3	[illegible]	–
	4	[illegible]	–
3	1	[illegible]	CALL HOLD
	2	[illegible]	CALL HOLD
	3	[illegible]	CALL HOLD
	4	[illegible]	CALL HOLD

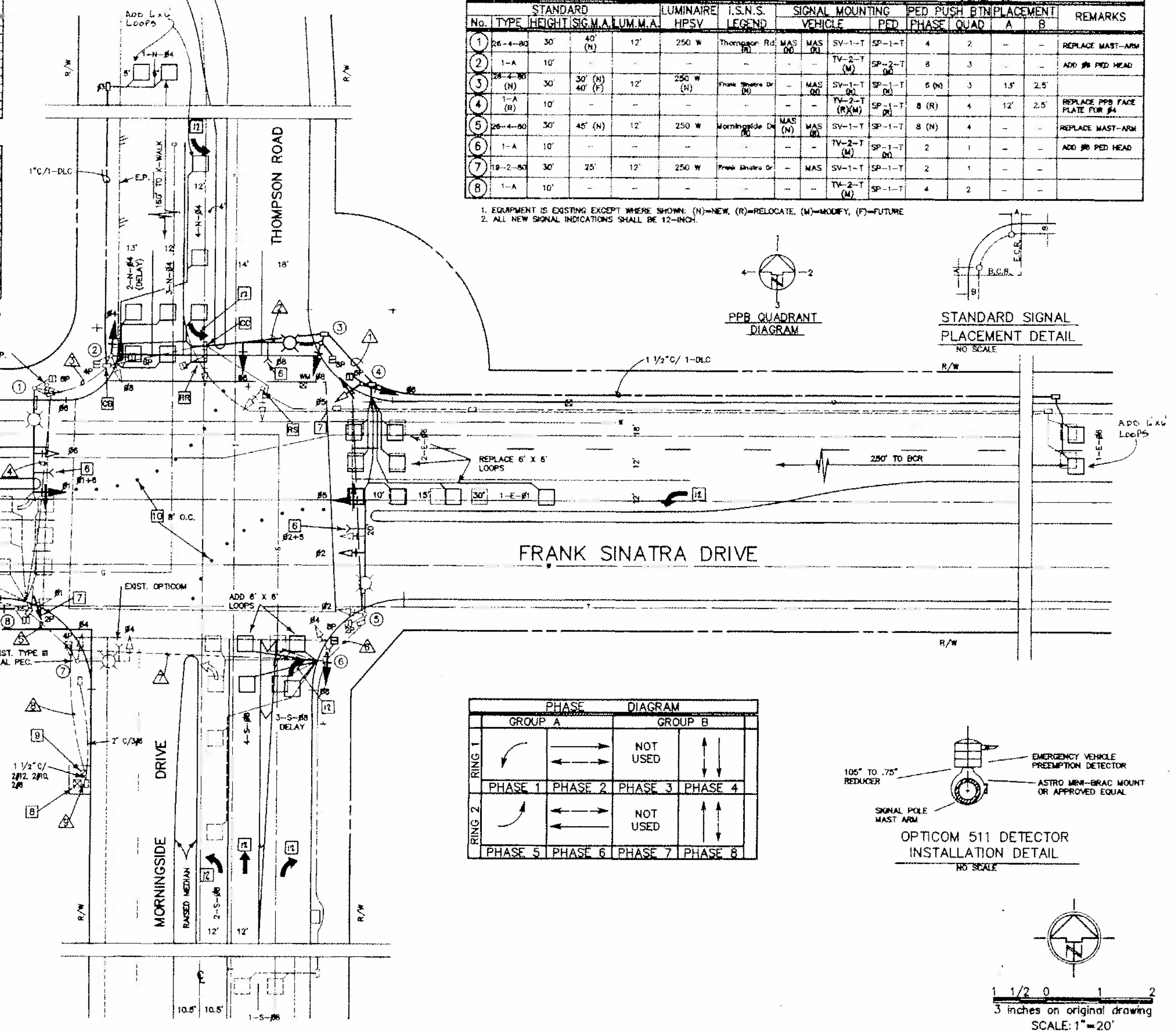
( ) = FOR FUTURE USE

PROPOSED DETECTOR SCHEDULE			
SENSOR UNIT	CHANN	DETECTOR	OPTION
1(E)	1	1-N-φ4	–
	2	2-N-φ4	DELAY
	3	2-S-φ8	–
	4	3-S-φ8	DELAY
2(E)	1	2-E-φ6	–
	2	1-E-φ1	–
	3	2-W-φ2	–
	4	1-W-φ5	–
3(E)	1	1-E-φ6	CALL HOLD
	2	1-E-φ6	CALL HOLD
	3	1-W-φ2	CALL HOLD
	4	1-N-φ4	CALL HOLD
4(N)	1	4-N-φ4	–
	2	4-S-φ8	–

REASSIGN PHASES 1, 4 AND 5.
ADD 1-DUAL CHANNEL SHELF MOUNTED UNIT.

POLE															SCHEDULE
	STANDARD				LUMINAIRE	I.S.N.S.	SIGNAL MOUNTING				PED PUSH BTN		PLACEMENT		REMARKS
No.	TYPE	HEIGHT	SIG.M.A.	LUM.M.A.	HPSV	LEGEND	VEHICLE			PED	PHASE	QUAD	A	B	
1	26-4-80	30'	40' (N)	12'	250 W	Thompson Rd (R)	MAS (M)	MAS (M)	SV-1-T	SP-1-T	4	2	–	–	REPLACE MAST-ARM
2	1-A	10'	–	–	–	–	–	–	TV-2-T (M)	SP-2-T (M)	8	3	–	–	ADD φ8 PED HEAD
3	26-4-80 (N)	30'	30' (N) 40' (F)	12'	250 W (N)	Frank Sinatra Dr (N)	–	MAS (M)	SV-1-T (M)	SP-1-T (M)	6 (N)	3	1.5'	2.5'	
4	1-A (R)	10'	–	–	–	–	–	–	TV-2-T (R)(M)	SP-1-T (R)	8 (R)	4	12'	2.5'	REPLACE PPB FACE PLATE FOR φ4
5	26-4-80	30'	45' (N)	12'	250 W	Morningside Dr (R)	MAS (N)	MAS (R)	SV-1-T	SP-1-T	8 (N)	4	–	–	REPLACE MAST-ARM
6	1-A	10'	–	–	–	–	–	–	TV-2-T (M)	SP-1-T (M)	2	1	–	–	ADD φ6 PED HEAD
7	19-2-80	30'	25'	12'	250 W	Frank Sinatra Dr	–	MAS	SV-1-T	SP-1-T	2	1	–	–	
8	1-A	10'	–	–	–	–	–	–	TV-2-T (M)	SP-1-T	4	2	–	–	

1. EQUIPMENT IS EXISTING EXCEPT WHERE SHOWN: (N)=NEW, (R)=RELOCATE, (M)=MODIFY, (F)=FUTURE
2. ALL NEW SIGNAL INDICATIONS SHALL BE 12-INCH.



PPB QUADRANT DIAGRAM

STANDARD SIGNAL PLACEMENT DETAIL
NO SCALE

PHASE	DIAGRAM			
	GROUP A		GROUP B	
RING 1	PHASE 1	PHASE 2	PHASE 3 (NOT USED)	PHASE 4
RING 2	PHASE 5	PHASE 6	PHASE 7 (NOT USED)	PHASE 8

OPTICOM 511 DETECTOR INSTALLATION DETAIL
NO SCALE

3 inches on original drawing
SCALE: 1"=20'

GENERAL NOTES

1. TRAFFIC SIGNAL AND LIGHTING SHALL CONFORM TO THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS SECTION 86 AND STANDARD PLANS DATED JULY 1992.
2. LOCATION OF ALL UNDERGROUND UTILITIES ARE APPROXIMATE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATIONS AND VERIFY ALL CONDITIONS ON THE JOB SITE. HAND DIG FOUNDATIONS UNTIL CLEAR OF OBSTRUCTIONS. PHONE UNDERGROUND SERVICE ALERT AT (800) 422-4133, 48 HOURS PRIOR TO ANY EXCAVATION.
3. OBTAIN APPROVAL FOR EXACT EQUIPMENT LOCATIONS PRIOR TO FINAL PLACEMENT.
4. ALL LOOPS SHALL BE 6' X 6' WITH 10' SPACING IN THE DIRECTION OF TRAVEL AND CENTERED IN THE LANE EXCEPT AS SHOWN. EXTEND LIMIT LINE LOOPS 2' INTO CROSSWALK OR PAST LIMIT LINE.
5. ALL VEHICLE INDICATIONS SHALL BE 12", PULLBOXES No. 5 AND CONDUIT 2" RIGID METAL EXCEPT AS SHOWN.
6. OPTICOM [illegible] – POLES 1 & 5 RELOCATE EXISTING DETECTOR TO NEW MAST ARM POLE 3 INSTALL NEW DETECTOR UNIT, SEE MOUNTING DETAIL THIS SHEET. SEE SPECIFICATIONS FOR MORE DETAILS.
7. REPLACE BALL LENSES WITH RED, YELLOW, AND GREEN ARROW LENSES – POLES 4 & 8. AFTER REWIRING IS COMPLETE.
8. MODIFY EXISTING TYPE 90 CONTROLLER AND TYPE "P" CABINET. INSTALL 2 VEHICLE AND 1 PED LOAD SWITCHES FOR PHASES 1 & 5 LEFT TURNS AND PHASE 8 PEDESTRIAN CROSSING ADD 3-DETECTOR CHANNELS AND HARNESS. SEE SPECIFICATIONS FOR MORE DETAILS.
9. EXISTING TYPE III 120/240 V SIGNAL AND LIGHTING SERVICE – DUAL METER WITH 40A SIGNAL, 15A ISNS AND SEPARATE METERED 30A LIGHTING BREAKERS.
10. INSTALL TYPE A WHITE NON-REFLECTIVE RPM'S AT A TRUE ARC ON 8' CENTERS. SEE STRIPING PLAN FOR MORE INFORMATION.
11. ALL NEW LOOP LOCATIONS TO BE APPROVED BY THE CITY PRIOR TO INSTALLATION. 24-NEW 6'x6' LOOPS TO BE INSTALLED.
12. INSTALL ALKYD THERMOPLASTIC ARROW AS INDICATED ON PLANS.

#811960

WESTON PRINGLE & ASSOCIATES
TRAFFIC AND TRANSPORTATION ENGINEERING

REGISTERED PROFESSIONAL ENGINEER – WESTON S. PRINGLE, JR. – EXP. 6/30/97 – CIVIL – STATE OF CALIFORNIA

Underground Service Alert
Call: TOLL FREE
1-800
422-4133

REVISIONS			REFERENCES	
NUMBER	DATE	INITIALS		APP'V'D

APPROVED BY ELDON K. LEE — RCE 23551 — EXP. 12-31-97 — DATE 12-4-94
DRAWN BY: RLM
CHECKED BY:
DESIGNED BY: SOMMERS

SHEET 1 OF 2

546

Note: THE CONDUCTOR SCHEDULE IS FOR ESTIMATING PURPOSES ONLY. THE CONTRACTOR IS TO DO THEIR OWN TAKEOFFS TO SUPPLY ALL NECESSARY CABLING

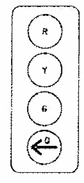
CONDUCTOR SCHEDULE

AWG	CONDUCTOR	CONDUIT RUN 1	2	3	4	5	6	7	8
#14	#1	-	-	-	3	3	-	-	-
	#2	-	-	-	-	3	3	3	3
	#3	-	-	-	-	-	-	-	-
	#4	-	-	3	3	6	3	3	-
	[illegible]	3	3	3	3	6	3	3	3
	[illegible]	3	3	3	3	3	-	-	-
	[illegible]	-	-	-	-	-	-	-	-
	[illegible]	-	3	3	3	3	3	3	-
	[illegible]	-	-	-	-	3	2	2	2
	[illegible]	-	-	-	2	4	2	-	-
	[illegible]	3	3	2	2	2	-	-	-
	[illegible]	-	(2)	(2)	(2)	(4)	(2)	(2)	-
	[illegible]	-	-	-	-	2	2	1	-
	[illegible]	-	-	-	1	2	-	-	-
	[illegible]	-	1	2	2	2	-	-	-
	[illegible]	(1)	(1)	(1)	(1)	(2)	(1)	(1)	(1)
	[illegible] COMMON	1	1	1	1	2	1	1	1
	[illegible]	3	3	3	3	6	3	3	3
	TOTAL #14	13	19	25	29	31	25	22	13
#12	I.S.N.S.	-	2	2	2	-	2	2	2
	TOTAL #12	-	2	2	2	-	2	2	2

CONDUCTOR SCHEDULE (CONT.)

AWG	CONDUCTOR	CONDUIT RUN 1	2	3	4	5	6	7	8
#10	[illegible]	1	1	1	1	1	1	1	1
	[illegible]	-	2	2	2	-	2	2	2
	TOTAL #10	1	3	3	3	2	3	3	3
DLC TYPE "C"	#1	1	1	1	1	1	-	-	-
	#2	-	-	-	-	2	-	-	-
	#3	-	-	-	-	-	-	-	-
	#4	-	-	2	2	2	-	-	-
	#5	-	-	-	-	1	-	-	-
	#6	2	2	2	2	2	-	-	-
	#7	-	-	-	-	-	-	-	-
	#8	-	-	-	-	3	3	3	-
	TOTAL DLC	3	3	6	5	11	3	3	-
OPTICOM 138 MODEL CABLE		-	-	-	1	2	1	1	1
	CONDUIT SIZE	2.5"	3"	3"	3"	2-3"	2.5"	3"	2"

Ⓧ INSTALL FOR FUTURE USE, COIL ADDITIONAL CONDUCTOR IN TERMINUS PULL BOX.



DETAIL "A"

POLE SCHEDULE

POLE NO.	POLE TYPE	HEIGHT	MAST ARM LENGTH SIGNAL	MAST ARM LENGTH LUMINAIRE	SIGNAL MOUNTING MA	SIGNAL MOUNTING POLE	SIGNAL MOUNTING PED	PPB #	PPB QUAD	H.P.S.V. LUMINAIRE	I.S.N.S. LEGEND	POLE PLACEMENT** B	E	A	REMARKS
A	26-4-80	30'	45'	15'	2-MAS	SV-1-UM	SP-1-CS	8 (F)	4	250 W.	Los Alamos Dr	-	-8.5'	2.5'	
B	1-A	10'	-	-	-	TV-2-UM	SP-1-CS (F)	2	1			11.5'	-	2.5'	
C	19-4-80	30'	20'	15'	1-MAS	SV-1-UM	SP-1-CS	2	1	250 W	Gerald Ford Dr	-	-2.5'	2.5'	
D	1-A	10'	-	-	-	TV-2-UM	SP-1-CS	4	2			2'	-	2.5'	
E	26-4-80	30'	45'	15'	2-MAS	SV-1-UM	SP-1-CS	4	2	250 W.	Inverness Dr	-	-2'	8'	
F	1-A	10'	-	-	-	TV-2-UM	SP-1-CS	6	3			11'	-	2.5'	
G	19-4-80	30'	25'	15'	1-MAS	SV-1-UM	SP-1-CS (F)	6	3	250 W.	Gerald Ford Dr	-	-10'	2.5'	
H	1-A	10'	-	-	-	TV-2-UM	SP-1-CS	8 (F)	4			3'	-	2.5'	

** FINAL POLE LOCATIONS TO BE DETERMINED BY THE ENGINEER IN THE FIELD PRIOR TO EXCAVATION BY CONTRACTOR.
(F) = FUTURE

GENERAL NOTES:

1. ALL WORK AND MATERIAL SHALL CONFORM TO THE STANDARD PLANS AND SPECIFICATIONS (DATED JANUARY 1988) OF CALIFORNIA DEPARTMENT OF TRANSPORTATION AND THE CONTRACT SPECIAL PROVISIONS OF THIS PROJECT.
2. EXACT EQUIPMENT AND DETECTOR LOOP LOCATIONS SHALL BE APPROVED BY THE CITY ENGINEER OR HIS REPRESENTATIVE PRIOR TO INSTALLATION BY THE CONTRACTOR.
3. ALL STRIPING, PAVEMENT MARKINGS AND SIGN REQUIREMENTS (REMOVAL OR INSTALLATIONS) SHALL BE COMPLETED NO MORE THAN ONE DAY PRIOR TO THE SCHEDULE TURN ON.
4. PULL BOX ADJACENT TO THE CONTROLLER SHALL BE No. 6E; ALL OTHERS SHALL BE No. 6 UNLESS NOTED OTHERWISE HERE ON.
5. ALL SIGNAL HEADS AND BACK PLATES SHALL BE METAL. ALL LENSES SHALL BE GLASS. LEFT-TURN HEADS SHALL HAVE RED, YELLOW AND GREEN ARROWS. ALL VEHICLE INDICATIONS SHALL BE 12". PEDESTRIAN INDICATION SHALL BE SOLID STATE INTERNATIONAL SYMBOL TYPE "C" WITH Z-CRATE VISORS.
6. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES, PUBLIC OR PRIVATE, AND TO PROTECT THEM FROM DAMAGE. THE CONTRACTOR SHALL BEAR THE TOTAL EXPENSE OF REPAIR OR REPLACEMENT OF ANY UNDERGROUND FACILITIES DAMAGED BY HIS OPERATIONS.
7. UNLESS SHOWN OTHERWISE, ALL INDUCTIVE LOOPS SHALL BE 6'X6' WITH 10' SPACING IN THE DIRECTION OF TRAVEL. NECESSARY STRIPING SHALL BE LOCATED PRIOR TO POSITIONING DETECTOR LOOPS
8. SEE CALTRANS STANDARD PLANS ES-1A AND ES-1B FOR SYMBOL AND ABBREVIATION LEGEND.
9. PEDESTRIAN PUSH BUTTONS SHALL BE LOCATED ON THE SIDE AT SIGNAL STANDARD NEAREST TO THE CROSSWALK.
10. CONTRACTOR SHALL RESTORE ALL LANDSCAPE AREAS TO ITS ORIGINAL CONDITIONS AFTER THE COMPLETION OF THIS PROJECT.
11. ALL TRAFFIC SIGNAL LAMPS SHALL BE 135 WATT DURO-TEST WATT SAVER TRAFFIC BULBS. CONTACT SANDY MILLER AT (714) 680-0432 or (800) 737-[illegible] Ext. [illegible]
12. ALL TRAFFIC SIGNAL EQUIPMENT SHALL BE FACTORY PAINTED (EXCEPT CONTROLLER CABINET). SEE SPECIFICATIONS FOR REQUIREMENTS.

CONSTRUCTION NOTES:

[1] INSTALL TRACONEX TMP 390 LATEST REVISION CONTROLLER IN TYPE "P" CABINET 18" ABOVE FINISH GRADE PER CITY SPECIAL PROVISIONS ALSO INSTALL ONE (1) 2 CHANNEL 3M OPTICOM PHASE SELECTOR 262 PER CONTRACT SPECIAL PROVISIONS.

[2] INSTALL TWO (2), ONE I.S.N.S. & ONE LUMINAIRES, TYPE II P.E.C. IN 120/240 VOLT TYPE III-CF DUAL METERS SIGNAL AND LIGHTING SERVICE. ALSO INSTALL
40 AMP SIGNAL BREAKER
30 AMP LIGHTING BREAKER
15 AMP I.S.N.S. BREAKER

[3] INSTALL 2"C - 3#4 (SERVICE, GFCI)

[4] INSTALL 2"C - 2#10 (LUMINAIRE), 2#12 (I.S.N.S.)

[5] INSTALL 3"C WITH PULLROPE PER SCE REQUIREMENTS. CONTACT RICK PROKAY (619) 321-4228.

[6] INSTALL 3M OPTICOM DETECTOR MODEL M511 ON MAST-ARM. DETECTOR INSTALLATION SHALL BE DONE BY TAPPING THE MAST ARM AT SPECIFIED LOCATIONS. DETECTOR SHALL BE PERFECTLY PARALLEL TO THE ROADWAY SURFACE.

[7] INSTALL R34 ON MAST-ARM

[8] APPLY 4" SOLID WHITE (THERMOPLASTIC, ALKYD RESIN) PER CONTRACT SPECIAL PROVISIONS

[9] APPLY 8" SOLID WHITE (DETAIL 38A) (THERMOPLASTIC, ALKYD RESIN) PER CONTRACT SPECIAL PROVISIONS

[10] APPLY 11" DOUBLE YELLOW (DETAIL 22) (THERMOPLASTIC, ALKYD RESIN) PER CONTRACT SPECIAL PROVISIONS.

[11] APPLY 12" SOLID WHITE (THERMOPLASTIC, ALKYD RESIN) PER CONTRACT SPECIAL PROVISIONS.

[12] APPLY "SIGNAL" "AHEAD" PAVEMENT MARKING (THERMOPLASTIC, ALKYD RESIN) PER CONTRACT SPECIAL PROVISIONS.

[13] ~~SAWCUT AND REMOVE 10' OF EXISTING ISLAND NOSE AND PAVING AND CONSTRUCT NEW ISLAND NOSE TO MATCH EXIST. CURB AND NEW PAVEMENT AS DIRECTED BY THE ENGINEER~~

[14] CONSTRUCT WHEEL CHAIR RAMP AND SIDE WALK PER CITY STD. PLAN No. 502 WHEELCHAIR DEPRESSION EXISTING.

[15] INSTALL YELLOW NON-REFLECTIVE MARKERS AT 6 FOOT SPACING. CITY ENGINEER TO APPROVE LOCATIONS PRIOR TO PLACEMENT.

[16] APPLY "ARROW" PAVEMENT MARKING-TYPE VI (L) (THERMOPLASTIC, ALKYD RESIN) PER CONTRACT SPECIAL PROVISIONS

[17] APPLY "ARROW" PAVEMENT MARKING-TYPE IV (R) (THERMOPLASTIC, ALKYD RESIN) PER CONTRACT SPECIAL PROVISIONS

[P] INSTALL SIGN (AS INDICATED) & POST PER CITY STD. PLAN No. 802.

[I] INSTALL SIGN (AS INDICATED) ON SIGNAL POLE.

[RM] REMOVE ALL CONFLICTING STRIPE AND/OR PAVEMENT MARKING BY GRINDING AND/OR BY WET SANDBLASTING.

[RS] REMOVE AND SALVAGE EXISTING SIGN & POST, BRING SALVAGE TO CITY YARD.

[RL] RELOCATE EXIST. SIGN AS SHOWN.

DETECTOR SCHEDULE

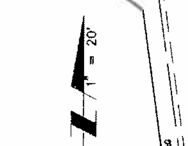
UNIT	CHANNELS	LOOP DESIGNATION	NUMBER OF LOOPS	FEATURES
#1	1	1-E-2	2	○□
	2	1-W-6	2	○□
	3	1-N-8	1	○□
	4	SPARE	-	
#2	1	2-E-2	4	
	2	1-E-5	4	□
#3	1	2-W-6	4	
	2	1-W-1	4	□
#4	1	2-N-8	2	
	2	3-N-8	2	△
#5	1	1-S-4	2	
	2	2-S-4	2	△

○ CALL-HOLD (EXTENSION)
□ FOR SAMPLING
△ DELAY

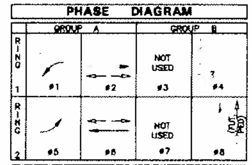
DETECTOR SHALL BE RACK-MOUNTED 2 AND/OR 4 CHANNEL (SEE CONTRACT SPECIAL PROVISIONS)

NOTES:
1. DETECTOR TIMING AND SAMPLING FEATURE MAY BE ACCOMPLISHED THROUGH INTERNAL LOGIC OF THE CONTROLLER UNIT.
2. SEE SPECIAL PROVISIONS REGARDING DETECTOR DISCONNECT.
3. DETECTOR LOOPS DESIGNATED FOR SAMPLING SHALL ALSO PERFORM NORMAL OPERATION.

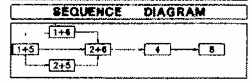
POLE PLACEMENT

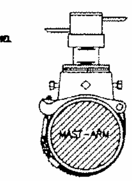


PHASE DIAGRAM

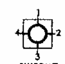


SEQUENCE DIAGRAM





MAST-ARM MOUNTING CLAMP FOR MODEL M511 OPTICAL DETECTOR



QUADRANT PEDESTRIAN PUSH BUTTON LOCATION (TOP VIEW)

BACKGROUND COLOR SHALL BE SAN DIMAS BROWN #806

GERALD FORD DRIVE
RANCHO MIRAGE

TYPICAL SIGN (N.T.S.)

CITY OF RANCHO MIRAGE
PUBLIC WORKS
APPROVED BY
CITY ENGINEER, CITY OF RANCHO MIRAGE R.C.E. No. 23551 EXP. 12-31-93
DATE 5-11-92

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

PRIVATE ENGINEERING NOTE
[illegible]

	Revision	Date	By
△	Changed SV on 1-A to TV; Changed TV on 2nd to SV	2-1-92	
△	Added [illegible] Conduit on Run 5	2-1-92	
△	Changed △ Run to △ Run; Spaces to Conduit		

DESIGNED BY KTO DRAWN BY DKT CHECKED BY BD

PREPARED UNDER THE DIRECTION OF
REGISTERED CIVIL ENGINEER NO. 35458
EXPIRATION DATE: 9/30/96 DATE: 5/8/92

RECOMMENDED BY:
James G. Dobbins RTE NO. 18
EXPIRATION DATE: 3/31/96 DATE: 5/8/92

J.F. Davidson Associates, Inc.
ENGINEERING PLANNING SURVEYING LANDSCAPE ARCHITECTURE
MUNICIPAL ENGINEERING DIVISION
3426 TENTH STREET
P.O. BOX 493
RIVERSIDE, CA 92502
(714) 683-0209 FAX (714) 686-5807

SCALE: 1" = 20'
DATE: MAY, 1992
BENCH MARK: N/A

TRAFFIC SIGNAL PLAN
GERALD FORD DRIVE
AND
LOS ALAMOS DR./INVERNESS DR.

1 OF 1 SHEETS

FOR CITY OF RANCHO MIRAGE

W.O. F.B. FILE NO. 9112876

S43.1

EXHIBIT “B”

MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)
SIGN CHART

ATTACHED

California Manual on Uniform Traffic Control Devices

FHWA's MUTCD 2009 Edition, including Revisions 1 & 2 as amended for use in California.

Sign Charts

2014 Edition

(Including Revision 1)

State of California
California State Transportation Agency
Department of Transportation

Caltrans

CalSTA
CALIFORNIA STATE TRANSPORTATION AGENCY

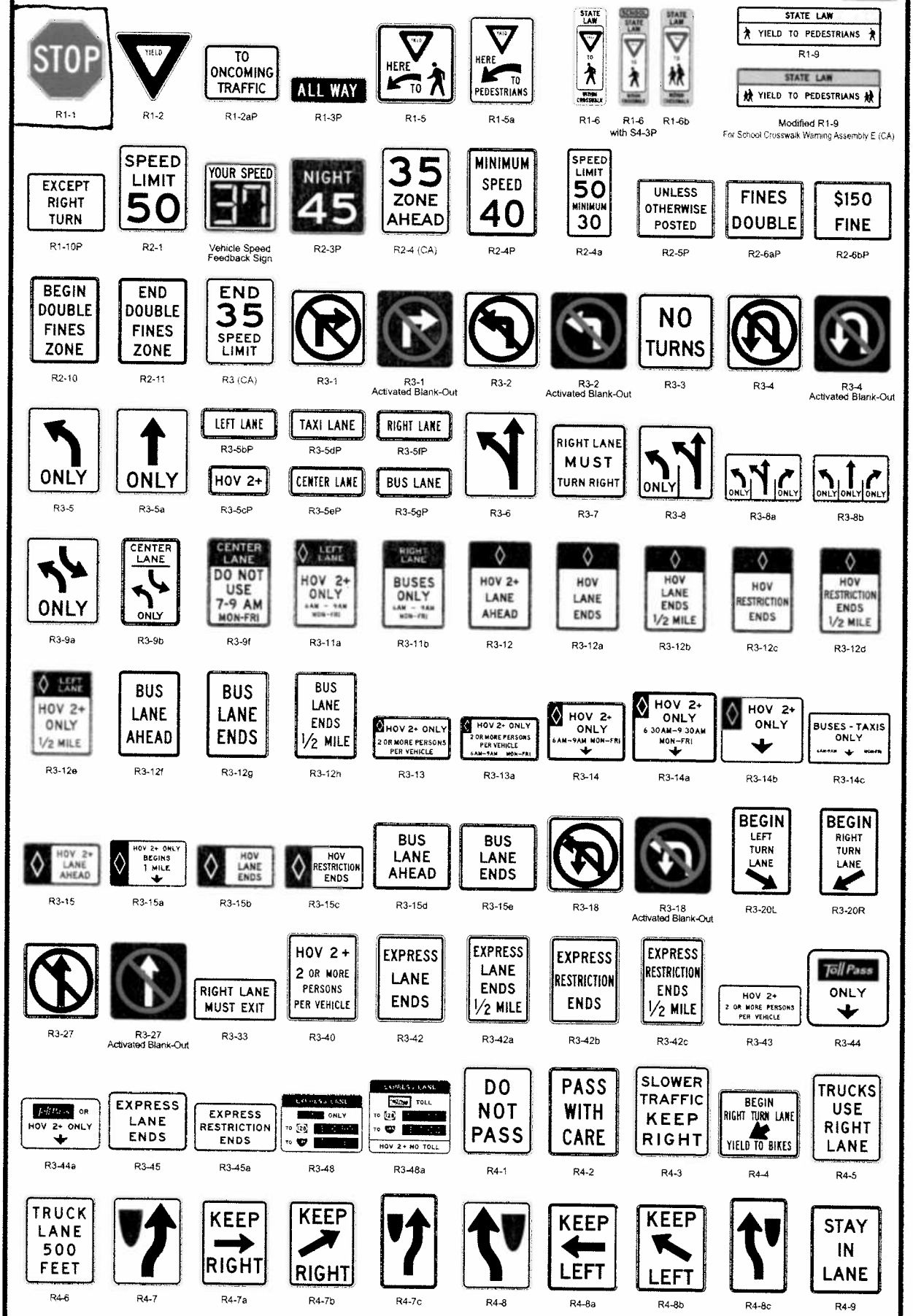
P.2

California MUTCD 2014 (Including Revision 1) Sign Charts

Sheet 1 of 14 - Regulatory Signs

This chart contains commonly used signs in California, and is not meant to be used as a comprehensive sign chart or a stand-alone sign design tool.
California signs are designated with a (CA) suffix. Otherwise, federal 2009 MUTCD sign designations are shown (formerly known as sign codes).
For sign specification details, visit **www.dot.ca.gov/hq/traffops/engineering/control-devices/specs.htm**.

California Department of Transportation
Division of Traffic Operations, Office of Traffic Engineering
Effective November 7, 2014



California MUTCD 2014 (Including Revision 1) Sign Charts

Sheet 6 of 14 - Warning Signs and Object Markers

This chart contains commonly used signs in California, and is not meant to be used as a comprehensive sign chart or a stand-alone sign design tool.
California signs are designated with a (CA) suffix. Otherwise, federal 2009 MUTCD sign designations are shown (formerly known as sign codes).
For sign specification details, visit **www.dot.ca.gov/hq/traffops/engineering/control-devices/specs.htm**.

California Department of Transportation
Division of Traffic Operations, Office of Traffic Engineering
Effective November 7, 2014


S1-1

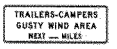

S3-1

S3-2

S4-3P

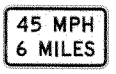
S4-5

SW4-1 (CA)



SW17-1 (CA)

SW22-1 (CA)



SW22-1A (CA)

SW24-1 (CA)


SW24-2 (CA)

SW24-3 (CA)

SW26 (CA)

SW32 (CA)

SW35 (CA)

SW37 (CA)

SW38 (CA)

SW41 (CA)


SW44 (CA)

SW46 (CA)

SW47 (CA)

SW48 (CA)

SW48-1 (CA)

SW49 (CA)

SW50 (CA)

SW52 (CA)


SW54 (CA)


SW54-1 (CA)

SW54C (CA)

SW58 (CA)


SW59 (CA)

SW60 (CA)


W1-1

W1-1a


W1-2

W1-2a

Vehicle Speed Feedback Sign
(Example assembly with W1-2a)


W1-3


W1-4

W1-5

W1-6

W1-7

W1-8

W1-10

W1-10a

W1-10b

W1-10c

W1-10d

W1-10e

W1-11

W1-13

W1-15

W2-1

W2-2

W2-3

W2-4

W2-5

W2-6

W2-7L

W2-7R

W2-8

W3-1

W3-2

W3-3

W3-4

W3-5

W3-6

W3-7

W3-8

W4-1

W4-1 (CA)

W4-2

W4-3

W4-4P

W4-4aP

W4-4bP

W4-5

W4-5P

W4-6

W4-10 (CA)

W4-14 (CA)

W4-18 (CA)

W4-22 (CA)

W5-1

W5-2

W5-3

W5-4a

W6-1

W6-2

W6-3

W7-1

W7-1a

W7-2bP

W7-3P

W7-3aP

W7-3bP

W7-4

W7-4b

W30A (CA)

W7-4c

EXHIBIT “C”

MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)
CHAPTER 2A

ATTACHED

Reflectivity

2009 Edition Chapter 2A. General

Section 2A.01 Function and Purpose of Signs

Support:

01 This Manual contains Standards, Guidance, and Options for the signing of all types of highways, and private roads open to public travel. The functions of sig are to provide regulations, warnings, and guidance information for road users. Words, symbols, and arrows are used to convey the messages. Signs are not typically used to confirm rules of the road.

02 Detailed sign requirements are located in the following Chapters of Part 2:

- Chapter 2B—Regulatory Signs, Barricades, and Gates
- Chapter 2C—Warning Signs and Object Markers
- Chapter 2D—Guide Signs for Conventional Roads
- Chapter 2E—Guide Signs for Freeways and Expressways
- Chapter 2F—Toll Road Signs
- Chapter 2G—Preferential and Managed Lane Signs
- Chapter 2H—General Information Signs
- Chapter 2I—General Service Signs
- Chapter 2J—Specific Service (Logo) Signs
- Chapter 2K—Tourist-Oriented Directional Signs
- Chapter 2L—Changeable Message Signs
- Chapter 2M—Recreational and Cultural Interest Area Signs
- Chapter 2N—Emergency Management Signs

Standard:

03 **Because the requirements and standards for signs depend on the particular type of highway upon which they are to be used, the definitions freeway, expressway, conventional road, and special purpose road given in Section 1A.13 shall apply in Part 2.**

Section 2A.02 Definitions

Support:

01 Definitions and acronyms that are applicable to signs are given in Sections 1A.13 and 1A.14.

Section 2A.03 Standardization of Application

Support:

01 It is recognized that urban traffic conditions differ from those in rural environments, and in many instances signs are applied and located differently. Where pertinent and practical, this Manual sets forth separate recommendations for urban and rural conditions.

Guidance:

02 *Signs should be used only where justified by engineering judgment or studies, as provided in Section 1A.09.*

03 *Results from traffic engineering studies of physical and traffic factors should indicate the locations where signs are deemed necessary or desirable.*

04 *Roadway geometric design and sign application should be coordinated so that signing can be effectively placed to give the road user any necessary regulatc warning, guidance, and other information.*

Standard:

05 **Each standard sign shall be displayed only for the specific purpose as prescribed in this Manual. Determination of the particular signs to b applied to a specific condition shall be made in accordance with the provisions set forth in Part 2. Before any new highway, private road open public travel (see definition in Section 1A.13), detour, or temporary route is opened to public travel, all necessary signs shall be in place. Sign required by road conditions or restrictions shall be removed when those conditions cease to exist or the restrictions are withdrawn.**

Section 2A.04 Excessive Use of Signs

Guidance:

01 *Regulatory and warning signs should be used conservatively because these signs, if used to excess, tend to lose their effectiveness. If used, route signs an directional guide signs should be used frequently because their use promotes efficient operations by keeping road users informed of their location.*

Section 2A.05 Classification of Signs

Standard:

01 **Signs shall be defined by their function as follows:**

A. Regulatory signs give notice of traffic laws or regulations.

B. Warning signs give notice of a situation that might not be readily apparent.

C. Guide signs show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreationa cultural information.

Support:

02 Object markers are defined in Section 2C.63.

Section 2A.06 Design of Signs

Support:

01 This Manual shows many typical standard signs and object markers approved for use on streets, highways, bikeways, and pedestrian crossings.

02 In the specifications for individual signs and object markers, the general appearance of the legend, color, and size are shown in the accompanying tables a

illustrations, and are not always detailed in the text.

03 Detailed drawings of standard signs, object markers, alphabets, symbols, and arrows (see Figure 2D-2) are shown in the "Standard Highway Signs and Markings" book. Section 1A.11 contains information regarding how to obtain this publication.

04 The basic requirements of a sign are that it be legible to those for whom it is intended and that it be understandable in time to permit a proper response. Desirable attributes include:

A. High visibility by day and night; and
B. High legibility (adequately sized letters, symbols, or arrows, and a short legend for quick comprehension by a road user approaching a sign).

05 Standardized colors and shapes are specified so that the several classes of traffic signs can be promptly recognized. Simplicity and uniformity in design, position, and application are important.

Standard:
06 **The term legend shall include all word messages and symbol and arrow designs that are intended to convey specific meanings.**

07 **Uniformity in design shall include shape, color, dimensions, legends, borders, and illumination or retroreflectivity.**

08 **Standardization of these designs does not preclude further improvement by minor changes in the proportion or orientation of symbols, wid of borders, or layout of word messages, but all shapes and colors shall be as indicated.**

09 **All symbols shall be unmistakably similar to, or mirror images of, the adopted symbol signs, all of which are shown in the "Standard Highv Signs and Markings" book (see Section 1A.11). Symbols and colors shall not be modified unless otherwise provided in this Manual. All symbols colors for signs not shown in the "Standard Highway Signs and Markings" book shall follow the procedures for experimentation and change described in Section 1A.10.**

Option:
10 Although the standard design of symbol signs cannot be modified, the orientation of the symbol may be changed to better reflect the direction of travel, if appropriate.

Standard:
11 **Where a standard word message is applicable, the wording shall be as provided in this Manual.**

12 **In situations where word messages are required other than those provided in this Manual, the signs shall be of the same shape and color a standard signs of the same functional type.**

Option:
13 State and local highway agencies may develop special word message signs in situations where roadway conditions make it necessary to provide road users additional regulatory, warning, or guidance information, such as when road users need to be notified of special regulations or warned about a situation that mig not be readily apparent. Unlike colors that have not been assigned or symbols that have not been approved for signs, new word message signs may be used wi the need for experimentation.

Standard:
14 **Except as provided in Paragraph 16 and except for the Carpool Information (D12-2) sign (see Section 2I.11), Internet addresses and e-mai addresses, including domain names and uniform resource locators (URL), shall not be displayed on any sign, supplemental plaque, sign panel (including logo sign panels on Specific Service signs), or changeable message sign.**

Guidance:
15 *Unless otherwise provided in this Manual for a specific sign, and except as provided in Paragraph 16, telephone numbers of more than four characters shou not be displayed on any sign, supplemental plaque, sign panel (including logo sign panels on specific service signs), or changeable message sign.*

Option:
16 Internet addresses, e-mail addresses, or telephone numbers with more than four characters may be displayed on signs, supplemental plaques, sign panels, changeable message signs that are intended for viewing only by pedestrians, bicyclists, occupants of parked vehicles, or drivers of vehicles on low-speed roadw where engineering judgment indicates that an area is available for drivers to stop out of the traffic flow to read the message.

Standard:
17 **Pictographs (see definition in Section 1A.13) shall not be displayed on signs except as specifically provided in this Manual. Pictographs sha be simple, dignified, and devoid of any advertising. When used to represent a political jurisdiction (such as a State, county, or municipal corporation) the pictograph shall be the official designation adopted by the jurisdiction. When used to represent a college or university, the pictograph shall be the official seal adopted by the institution. Pictorial representations of university or college programs shall not be permitt to be displayed on a sign.**

Section 2A.07 Retroreflectivity and Illumination

Support:
01 There are many materials currently available for retroreflection and various methods currently available for the illumination of signs and object markers. N materials and methods continue to emerge. New materials and methods can be used as long as the signs and object markers meet the standard requirements f color, both by day and by night.

Standard:
02 **Regulatory, warning, and guide signs and object markers shall be retroreflective (see Section 2A.08) or illuminated to show the same shap and similar color by both day and night, unless otherwise provided in the text discussion in this Manual for a particular sign or group of signs.**

03 **The requirements for sign illumination shall not be considered to be satisfied by street or highway lighting.**

Option:
04 Sign elements may be illuminated by the means shown in Table 2A-1.

Table 2A-1. Illumination of Sign Elements

Means of Illumination	Sign Element To Be Illuminated
Light behind the sign face	▪ Symbol or word message ▪ Background ▪ Symbol, word message, and background (through a translucent material)
Attached or independently mounted light source designed to direct essentially uniform illumination onto the sign face	▪ Entire sign face
Light emitting diodes (LEDs)	▪ Symbol or word message ▪ Portions of the sign border
Other devices, or treatments that highlight the sign shape, color, or message:	▪ Symbol or word message

Luminous tubing Fiber optics Incandescent light bulbs Luminescent panels	• Entire sign face

05 Retroreflection of sign elements may be accomplished by the means shown in Table 2A-2.

Table 2A-2. Retroreflection of Sign Elements

Means of Retroreflection	Sign Element
Reflector "buttons" or similar units	Symbol Word message Border
A material that has a smooth, sealed outer surface over a microstructure that reflects light	Symbol Word message Border Background

06 Light Emitting Diode (LED) units may be used individually within the legend or symbol of a sign and in the border of a sign, except for changeable message signs, to improve the conspicuity, increase the legibility of sign legends and borders, or provide a changeable message.

Standard:

07 **Except as provided in Paragraphs 11 and 12, neither individual LEDs nor groups of LEDs shall be placed within the background area of a sig**

08 **If used, the LEDs shall have a maximum diameter of 1/4 inch and shall be the following colors based on the type of sign:**

A. White or red, if used with STOP or YIELD signs.
B. White, if used with regulatory signs other than STOP or YIELD signs.
C. White or yellow, if used with warning signs.
D. White, if used with guide signs.
E. White, yellow, or orange, if used with temporary traffic control signs.
F. White or yellow, if used with school area signs.

09 **If flashed, all LED units shall flash simultaneously at a rate of more than 50 and less than 60 times per minute.**

10 **The uniformity of the sign design shall be maintained without any decrease in visibility, legibility, or driver comprehension during either daytime or nighttime conditions.**

Option:

11 For STOP and YIELD signs, LEDs may be placed within the border or within one border width within the background of the sign.

12 For STOP/SLOW paddles (see Section 6E.03) used by flaggers and the STOP paddles (see Section 7D.05) used by adult crossing guards, individual LEDs or groups of LEDs may be used.

Support:

13 Other methods of enhancing the conspicuity of standard signs are described in Section 2A.15.

14 Information regarding the use of retroreflective material on the sign support is contained in Section 2A.21.

Section 2A.08 Maintaining Minimum Retroreflectivity

Support:

01 Retroreflectivity is one of several factors associated with maintaining nighttime sign visibility (see Section 2A.22).

Standard:

02 **Public agencies or officials having jurisdiction shall use an assessment or management method that is designed to maintain sign retroreflectivity at or above the minimum levels in Table 2A-3.**

Table 2A-3. Minimum Maintained Retroreflectivity Levels[1]

Sign Color	Sheeting Type (ASTM D4956-04)				Additional Criteria
	Beaded Sheeting			Prismatic Sheeting	
	I	II	III	III, IV, VI, VII, VIII, IX, X	
White on Green	W*; G ≥ 7	W*; G ≥ 15	W*; G ≥ 25	W ≥ 250; G ≥ 25	Overhead
	W*; G ≥ 7	W ≥ 120; G ≥ 15			Post-mounted
Black on Yellow or Black on Orange	Y*; O*	Y ≥ 50; O ≥ 50			2
	Y*; O*	Y ≥ 75; O ≥ 75			3
White on Red	W ≥ 35; R ≥ 7				4
Black on White	W ≥ 50				—

Notes:
[1] The minimum maintained retroreflectivity levels shown in this table are in units of cd/lx/m^2 measured at an observation angle of 0.2° and an entrance angle of -4.0°.
[2] For text and fine symbol signs measuring at least 48 inches and for all sizes of bold symbol signs
[3] For text and fine symbol signs measuring less than 48 inches
[4] Minimum sign contrast ratio ≥ 3:1 (white retroreflectivity ÷ red retroreflectivity)
* This sheeting type shall not be used for this color for this application.

Bold Symbol Signs

- W1-1, -2 – Turn and Curve
- W1-3, -4 – Reverse Turn and Curve
- W1-5 – Winding Road
- W1-6, -7 – Large Arrow
- W1-8 – Chevron
- W1-10 – Intersection in Curve
- W1-11 – Hairpin Curve
- W3-1 – Stop Ahead
- W3-2 – Yield Ahead
- W3-3 – Signal Ahead
- W4-1 – Merge
- W4-2 – Lane Ends
- W4-3 – Added Lane
- W4-5 – Entering Roadway Merge
- W4-6 – Entering Roadway Added Lane
- W6-1, -2 – Divided Highway Begins and Ends
- W11-2 – Pedestrian Crossing
- W11-3, -4, -16-22 – Large Animals
- W11-5 – Farm Equipment
- W11-6 – Snowmobile Crossing
- W11-7 – Equestrian Crossing
- W11-8 – Fire Station
- W11-10 – Truck Crossing
- W12-1 – Double Arrow
- W16-5P, -6P, -7P – Pointing Arrow

• W1-15 – 270 Degree Loop • W2-1 – Cross Road • W2-2, -3 – Side Road • W2-4, -5 – T and Y Intersection • W2-6 – Circular Intersection • W2-7, -8 – Double Side Roads	• W6-3 – Two-Way Traffic • W10-1, -2, -3, -4, -11, -12 – Grade Crossing Advance Warning	Plaques • W20-7 – Flagger • W21-1 – Worker

Fine Symbol Signs (symbol signs not listed as bold symbol signs)
Special Cases
• W3-1 – Stop Ahead: Red retroreflectivity ≥ 7 • W3-2 – Yield Ahead: Red retroreflectivity ≥ 7; White retroreflectivity ≥ 35 • W3-3 – Signal Ahead: Red retroreflectivity ≥ 7; Green retroreflectivity ≥ 7 • W3-5 – Speed Reduction: White retroreflectivity ≥ 50 • For non-diamond shaped signs such as W14-3 (No Passing Zone), W4-4P (Cross Traffic Does Not Stop), or W13-1P, -2, -3, -6, -7(Speed Advisory Signs), use largest sign dimension to determine proper minimum retroreflectivity level.

Support:
03 Compliance with the Standard in Paragraph 2 is achieved by having a method in place and using the method to maintain the minimum levels established in Table 2A-3. Provided that an assessment or management method is being used, an agency or official having jurisdiction would be in compliance with the Standa in Paragraph 2 even if there are some individual signs that do not meet the minimum retroreflectivity levels at a particular point in time.

Guidance:
04 *Except for those signs specifically identified in Paragraph 6, one or more of the following assessment or management methods should be used to maintain s retroreflectivity:*

A. Visual Nighttime Inspection—The retroreflectivity of an existing sign is assessed by a trained sign inspector conducting a visual inspection from a moving vehicle during nighttime conditions. Signs that are visually identified by the inspector to have retroreflectivity below the minimum levels should be replac
B. Measured Sign Retroreflectivity—Sign retroreflectivity is measured using a retroreflectometer. Signs with retroreflectivity below the minimum levels shou be replaced.
C. Expected Sign Life—When signs are installed, the installation date is labeled or recorded so that the age of a sign is known. The age of the sign is compar to the expected sign life. The expected sign life is based on the experience of sign retroreflectivity degradation in a geographic area compared to the minimum levels. Signs older than the expected life should be replaced.
D. Blanket Replacement—All signs in an area/corridor, or of a given type, should be replaced at specified intervals. This eliminates the need to assess retroreflectivity or track the life of individual signs. The replacement interval is based on the expected sign life, compared to the minimum levels, for the shortest-life material used on the affected signs.
E. Control Signs—Replacement of signs in the field is based on the performance of a sample of control signs. The control signs might be a small sample loca in a maintenance yard or a sample of signs in the field. The control signs are monitored to determine the end of retroreflective life for the associated sigr All field signs represented by the control sample should be replaced before the retroreflectivity levels of the control sample reach the minimum levels.
F. Other Methods—Other methods developed based on engineering studies can be used.

Support:
05 Additional information about these methods is contained in the 2007 Edition of FHWA's "Maintaining Traffic Sign Retroreflectivity" (see Section 1A.11).

Option:
06 Highway agencies may exclude the following signs from the retroreflectivity maintenance guidelines described in this Section:

A. Parking, Standing, and Stopping signs (R7 and R8 series)
B. Walking/Hitchhiking/Crossing signs (R9 series, R10-1 through R10-4b)
C. Acknowledgment signs
D. All signs with blue or brown backgrounds
E. Bikeway signs that are intended for exclusive use by bicyclists or pedestrians

Section 2A.09 Shapes

Standard:
01 **Particular shapes, as shown in Table 2A-4, shall be used exclusively for specific signs or series of signs, unless otherwise provided in the discussion in this Manual for a particular sign or class of signs.**

Table 2A-4. Use of Sign Shapes

Shape	Signs
Octagon	Stop*
Equilateral Triangle (1 point down)	Yield*
Circle	Grade Crossing Advance Warning*
Pennant Shape/ Isosceles Triangle (longer axis horizontal)	No Passing*
Pentagon (pointed up)	School Advance Warning Sign (squared bottom corners)* County Route Sign (tapered bottom corners)*
Crossbuck (two rectangles in an "X" configuration)	Grade Crossing*
Diamond	Warning Series
Rectangle (including square)	Regulatory Series Guide Series** Warning Series
Trapezoid	Recreational and Cultural Interest Area Series National Forest Route Sign

* This sign shall be exclusively the shape shown.
** Guide series includes general service, specific service, tourist-oriented directional, general information, recreational and cultural interest area, and emergency management signs.

Standard:

01 **The colors to be used on standard signs and their specific use on these signs shall be as provided in the applicable Sections of this Manual. The color coordinates and values shall be as described in 23 CFR, Part 655, Subpart F, Appendix.**

Support:

02 As a quick reference, common uses of sign colors are shown in Table 2A-5. Color schemes on specific signs are shown in the illustrations located in each appropriate Chapter.

Table 2A-5. Common Uses of Sign Colors

Type of Sign	Legend								Background										
	Black	Green	Red	White	Yellow	Orange	Flourescent Yellow-Green	Flourescent Pink	Black	Blue	Brown	Green	Orange*	Red*	White	Yellow*	Purple	Fluorescent Yellow-Green	Fluo F
Regulatory	X		X	X					X					X	X				
Prohibitive			X	X										X	X				
Permissive		X													X				
Warning	X															X			
Pedestrian	X															X		X	
Bicycle	X															X		X	
Guide				X								X							
Interstate Route				X						X				X					
State Route	X														X				
U.S. Route	X														X				
County Route					X					X									
Forest Route				X							X								
Street Name				X															
Destination				X															
Reference Location				X															
Information				X						X									
Evacuation Route				X						X									
Road User Service				X						X									
Recreational				X							X	X							
Temporary Traffic Control	X												X						
Incident Management	X												X						
School	X																	X	
ETC-Account Only	X																X ****		
Changeable Message Signs																			
Regulatory			X ***	X					X										
Warning					X				X										
Temporary Traffic Control					X	X			X										
Guide				X					X			X **						X	
Motorist Services				X					X	X **									
Incident Management					X			X	X										
School, Pedestrian, Bicycle					X		X		X										

* Fluorescent versions of these background colors may also be used.

** These alternative background colors would be provided by blue or green lighted pixels such that the entire CMS would be lighted, not just the legend.

*** Red is used only for the circle and slash or other red elements of a similar static regulatory sign.

**** The use of the color purple on signs is restricted per the provisions of Paragraph 1 of Section 2F.03.

03 Whenever white is specified in this Manual or in the "Standard Highway Signs and Markings" book (see Section 1A.11) as a color, it is understood to include silver-colored retroreflective coatings or elements that reflect white light.

04 The colors coral and light blue are being reserved for uses that will be determined in the future by the Federal Highway Administration.

05 Information regarding color coding of destinations on guide signs, including community wayfinding signs, is contained in Chapter 2D.

Option:

06 The approved fluorescent version of the standard red, yellow, green, or orange color may be used as an alternative to the corresponding standard color.

Section 2A.11 Dimensions

Support:
01 The "Standard Highway Signs and Markings" book (see Section 1A.11) prescribes design details for up to five different sizes depending on the type of traffi facility, including bikeways. Smaller sizes are designed to be used on bikeways and some other off-road applications. Larger sizes are designed for use on free and expressways, and can also be used to enhance road user safety and convenience on other facilities, especially on multi-lane divided highways and on undiv highways having five or more lanes of traffic and/or high speeds. The intermediate sizes are designed to be used on other highway types.

Standard:
02 **The sign dimensions prescribed in the sign size tables in the various Parts and Chapters in this Manual and in the "Standard Highway Signs and Markings" book (see Section 1A.11) shall be used unless engineering judgment determines that other sizes are appropriate. Except as provided in Paragraph 3, where engineering judgment determines that sizes smaller than the prescribed dimensions are appropriate for use, t sign dimensions shall not be less than the minimum dimensions specified in this Manual. The sizes shown in the Minimum columns that are smaller than the sizes shown in the Conventional Road columns in the various sign size tables in this Manual shall only be used on low-speed roadways, alleys, and private roads open to public travel where the reduced legend size would be adequate for the regulation or warning or where physical conditions preclude the use of larger sizes.**

Option:
03 For alleys with restrictive physical conditions and vehicle usage that limits installation of the minimum size sign (or the Conventional Road size sign if no Minimum size is shown), both the sign height and the sign width may be decreased by up to 6 inches.

Guidance:
04 *The sizes shown in the Freeway and Expressway columns in the various sign size tables in this Manual should be used on freeways and expressways, and f other higher-speed applications based upon engineering judgment, to provide larger signs for increased visibility and recognition.*

05 *The sizes shown in the Oversized columns in the various sign size tables in this Manual size should be used for those special applications where speed, volu or other factors result in conditions where increased emphasis, improved recognition, or increased legibility is needed, as determined by engineering judgment study.*

06 *Increases above the prescribed sizes should be used where greater legibility or emphasis is needed. If signs larger than the prescribed sizes are used, the overall sign dimensions should be increased in 6-inch increments.*

Standard:
07 **Where engineering judgment determines that sizes that are different than the prescribed dimensions are appropriate for use, standard sha and colors shall be used and standard proportions shall be retained as much as practical.**

Guidance:
08 *When supplemental plaques are installed with larger sized signs, a corresponding increase in the size of the plaque and its legend should also be made. The resulting plaque size should be approximately in the same relative proportion to the larger sized sign as the conventional sized plaque is to the conventional siz sign.*

Section 2A.12 Symbols

Standard:
01 **Symbol designs shall in all cases be unmistakably similar to those shown in this Manual and in the "Standard Highway Signs and Markings' book (see Section 1A.11).**

Support:
02 New symbol designs are adopted by the Federal Highway Administration based on research evaluations to determine road user comprehension, sign conspicuity, and sign legibility.

03 Sometimes a change from word messages to symbols requires significant time for public education and transition. Therefore, this Manual sometimes includ the practice of using educational plaques to accompany new symbol signs.

Guidance:
04 *New warning or regulatory symbol signs not readily recognizable by the public should be accompanied by an educational plaque.*

Option:
05 Educational plaques may be left in place as long as they are in serviceable condition.

06 State and/or local highway agencies may conduct research studies to determine road user comprehension, sign conspicuity, and sign legibility.

Guidance:
07 *Although most standard symbols are oriented facing left, mirror images of these symbols should be used where the reverse orientation might better convey road users a direction of movement.*

Standard:
08 **A symbol used for a given category of signs (regulatory, warning, or guide) shall not be used for a different category of signs, except as specifically authorized in this Manual.**

09 **Except as provided in Paragraph 11, a recreational and cultural interest area symbol (see Chapter 2M) shall not be used on streets or highways outside of recreational and cultural interest areas.**

10 **A recreational and cultural interest area guide sign symbol (see Chapter 2M) shall not be used on any regulatory or warning sign on any street, road, or highway.**

Option:
11 A recreational and cultural interest area guide sign symbol (see Section 2M.04) may be used on a highway guide sign outside of a recreational and cultural interest area to supplement a comparable word message for which there is no approved symbol for that message in Chapters 2B through 2I or 2N.

Support:
12 Section 2M.07 contains provisions for the use of recreational and cultural interest area symbols to indicate prohibited activities or items in non-road applications.

Section 2A.13 Word Messages

Standard:
01 **Except as provided in Section 2A.06, all word messages shall use standard wording and letters as shown in this Manual and in the "Standa Highway Signs and Markings" book (see Section 1A.11).**

Guidance:
02 *Word messages should be as brief as possible and the lettering should be large enough to provide the necessary legibility distance. A minimum specific rati 1 inch of letter height per 30 feet of legibility distance should be used.*

03 *Abbreviations (see Section 1A.15) should be kept to a minimum.*

04 *Word messages should not contain periods, apostrophes, question marks, ampersands, or other punctuation or characters that are not letters, numerals, or hyphens unless necessary to avoid confusion.*

05 *The solidus (slanted line or forward slash) is intended to be used for fractions only and should not be used to separate words on the same line of legend. Instead, a hyphen should be used for this purpose, such as "TRUCKS - BUSES."*

Standard:

06 **Fractions shall be displayed with the numerator and denominator diagonally arranged about the solidus (slanted line or forward slash). Th overall height of the fraction is measured from the top of the numerator to the bottom of the denominator, each of which is vertically aligned the upper and lower ends of the solidus. The overall height of the fraction shall be determined by the height of the numerals within the fractio and shall be 1.5 times the height of an individual numeral within the fraction.**

Support:

07 The "Standard Highway Signs and Markings" book (see Section 1A.11) contains details regarding the layouts of fractions on signs.

Guidance:

08 *When initials are used to represent an abbreviation for separate words (such as "U S" for a United States route), the initials should be separated by a spac between 1/2 and 3/4 of the letter height of the initials.*

09 *When an Interstate route is displayed in text form instead of using the route shield, a hyphen should be used for clarity, such as "I-50."*

Standard:

10 **All sign lettering shall be in upper-case letters as provided in the "Standard Highway Signs and Markings" book (see Section 1A.11), unles otherwise provided in this Manual for a particular sign or type of message.**

11 **The sign lettering for names of places, streets, and highways shall be composed of a combination of lower-case letters with initial upper-c letters.**

Support:

12 Letter height is expressed in terms of the height of an upper-case letter. For mixed-case legends (those composed of an initial upper-case letter followed b lower-case letters), the height of the lower-case letters is derived from the specified height of the initial upper-case letter based on a prescribed ratio. Letter heights for mixed-case legends might be expressed in terms of both the upper- and lower-case letters, or in terms of the initial upper-case letter alone. When t height of a lower-case letter is specified or determined from the prescribed ratio, the reference is to the nominal loop height of the letter. The term loop height refers to the portion of a lower-case letter that excludes any ascending or descending stems or tails of the letter, such as with the letters "d" or "q." The nomin loop height is equal to the actual height of a non-rounded lower-case letter whose form does not include ascending or descending stems or tails, such as the let "x." The rounded portions of a lower-case letter extend slightly above and below the baselines projected from the top and bottom of such a non-rounded letter s that the appearance of a uniform letter height within a word is achieved. The actual loop height of a rounded lower-case letter is slightly greater than the nomir loop height and this additional height is excluded from the expression of the lower-case letter height.

Standard:

13 **When a mixed-case legend is used, the height of the lower-case letters shall be 3/4 of the height of the initial upper-case letter.**

14 **The unique letter forms for each of the Standard Alphabet series shall not be stretched, compressed, warped, or otherwise manipulated.**

Support:

15 Section 2D.04 contains information regarding the acceptable methods of modifying the length of a word for a given letter height and series.

Section 2A.14 Sign Borders

Standard:

01 **Unless otherwise provided, each sign illustrated in this Manual shall have a border of the same color as the legend, at or just inside the ed**

02 **The corners of all sign borders shall be rounded, except for STOP signs.**

Guidance:

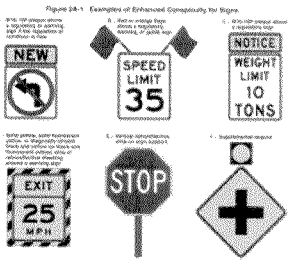
03 *A dark border on a light background should be set in from the edge, while a light border on a dark background should extend to the edge of the sign. A bor for 30-inch signs with a light background should be from 1/2 to 3/4 inch in width, 1/2 inch from the edge. For similar signs with a light border, a width of 1 inch should be used. For other sizes, the border width should be of similar proportions, but should not exceed the stroke-width of the major lettering of the sign. On signs exceeding 72 x 120 inches in size, the border should be 2 inches wide, or on larger signs, 3 inches wide. Except for STOP signs and as otherwise provided Section 2E.16, the corners of the sign should be rounded to a radius that is concentric with that of the border.*

Section 2A.15 Enhanced Conspicuity for Standard Signs

Option:

01 Based upon engineering judgment, where the improvement of the conspicuity of a standard regulatory, warning, or guide sign is desired, any of the followi methods may be used, as appropriate, to enhance the sign's conspicuity (see Figure 2A-1):

Figure 2A-1 Examples of Enhanced Conspicuity for Signs



A. Increasing the size of a standard regulatory, warning, or guide sign.

B. Doubling-up of a standard regulatory, warning, or guide sign by adding a second identical sign on the left-hand side of the roadway.

C. Adding a solid yellow or fluorescent yellow rectangular "header panel" above a standard regulatory sign, with the width of the panel corresponding to the width of the standard regulatory sign. A legend of "NOTICE," "STATE LAW," or other appropriate text may be added in black letters within the header pane a period of time determined by engineering judgment.

D. Adding a NEW plaque (see Section 2C.62) above a new standard regulatory or warning sign, for a period of time determined by engineering judgment, to attention to the new sign.

E. Adding one or more red or orange flags (cloth or retroreflective sheeting) above a standard regulatory or warning sign, with the flags oriented so as to be 45 degrees to the vertical.

F. Adding a solid yellow, a solid fluorescent yellow, or a diagonally striped black and yellow (or black and fluorescent yellow) strip of retroreflective sheetin least 3 inches wide around the perimeter of a standard warning sign. This may be accomplished by affixing the standard warning sign on a background th 6 inches larger than the size of the standard warning sign.

G. Adding a warning beacon (see Section 4L.03) to a standard regulatory (other than a STOP or a Speed Limit sign), warning, or guide sign.

H. Adding a speed limit sign beacon (see Section 4L.04) to a standard Speed Limit sign.

I. Adding a stop beacon (see Section 4L.05) to a STOP sign.

J. Adding light emitting diode (LED) units within the symbol or legend of a sign or border of a standard regulatory, warning, or guide sign, as provided in Se 2A.07.

K. Adding a strip of retroreflective material to the sign support in compliance with the provisions of Section 2A.21.

L. Using other methods that are specifically allowed for certain signs as described elsewhere in this Manual.

Support:

02 Sign conspicuity improvements can also be achieved by removing non-essential and illegal signs from the right-of-way (see Section 1A.08), and by relocati signs to provide better spacing.

Standard:

03 **The NEW plaque (see Section 2C.62) shall not be used alone.**

04 **Strobe lights shall not be used to enhance the conspicuity of highway signs.**

Section 2A.16 Standardization of Location

Support:

01 Standardization of position cannot always be attained in practice. Examples of heights and lateral locations of signs for typical installations are illustrated ir Figure 2A-2, and examples of locations for some typical signs at intersections are illustrated in Figures 2A-3 and 2A-4.

Figure 2A-2 Examples of Heights and Lateral Locations of Sign Installations

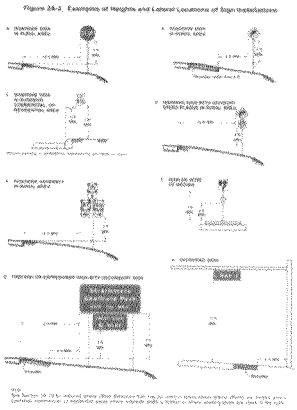
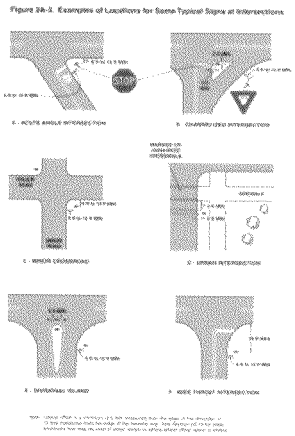
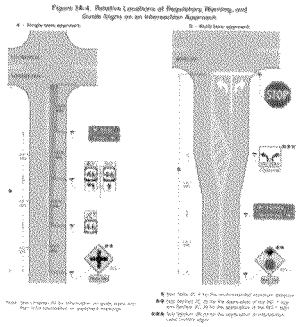


Figure 2A-3 Examples of Locations for Some Typical Signs at Intersections



02 Examples of advance signing on an intersection approach are illustrated in Figure 2A-4. Chapters 2B, 2C, and 2D contain provisions regarding the applicatio regulatory, warning, and guide signs, respectively.

Figure 2A-4 Relative Locations of Regulatory, Warning, and Guide Signs on an Intersection Approach



Standard:

03 **Signs requiring separate decisions by the road user shall be spaced sufficiently far apart for the appropriate decisions to be made. One of factors considered when determining the appropriate spacing shall be the posted or 85th-percentile speed.**

Guidance:

04 *Signs should be located on the right-hand side of the roadway where they are easily recognized and understood by road users. Signs in other locations shou be considered only as supplementary to signs in the normal locations, except as otherwise provided in this Manual.*

05 *Signs should be individually installed on separate posts or mountings except where:*

- *A. One sign supplements another;*
- *B. Route or directional signs are grouped to clarify information to motorists;*
- *C. Regulatory signs that do not conflict with each other are grouped, such as turn prohibition signs posted with one way signs or a parking regulation sign po with a speed limit sign; or*
- *D. Street name signs are posted with a stop or yield sign.*

06 *Signs should be located so that they:*

- *A. Are outside the clear zone unless placed on a breakaway or yielding support (see Section 2A.19),*
- *B. Optimize nighttime visibility,*
- *C. Minimize the effects of mud splatter and debris,*
- *D. Do not obscure each other,*
- *E. Do not obscure the sight distance to approaching vehicles on the major street for drivers who are stopped on minor-street approaches, and*
- *F. Are not hidden from view.*

Support:

07 The clear zone is the total roadside border area, starting at the edge of the traveled way, available for use by errant vehicles. The width of the clear zone i dependent upon traffic volumes, speeds, and roadside geometry. Additional information can be found in AASHTO's "Roadside Design Guide" (see Section 1A.11)

Guidance:

08 *With the increase in traffic volumes and the desire to provide road users regulatory, warning, and guidance information, an order of priority for sign install should be established.*

Support:

09 An order of priority is especially critical where space is limited for sign installation and there is a demand for several different types of signs. Overloading r users with too much information is not desirable.

Guidance:

10 *Because regulatory and warning information is more critical to the road user than guidance information, regulatory and warning signing whose location is critical should be displayed rather than guide signing in cases where conflicts occur. Community wayfinding and acknowledgment guide signs should have a lowe priority as to placement than other guide signs. Information of a less critical nature should be moved to less critical locations or omitted.*

Option:

11 Under some circumstances, such as on curves to the right, signs may be placed on median islands or on the left-hand side of the road. A supplementary sig located on the left-hand side of the roadway may be used on a multi-lane road where traffic in a lane to the right might obstruct the view to the right.

Guidance:

12 *In urban areas where crosswalks exist, signs should not be placed within 4 feet in advance of the crosswalk (see Drawing D in Figure 2A-3).*

Section 2A.17 Overhead Sign Installations

Guidance:

01 *Overhead signs should be used on freeways and expressways, at locations where some degree of lane-use control is desirable, and at locations where spac not available at the roadside.*

Support:

02 The operational requirements of the present highway system are such that overhead signs have value at many locations. The factors to be considered for th installation of overhead sign displays are not definable in specific numerical terms.

Option:

03 The following conditions (not in priority order) may be considered in an engineering study to determine if overhead signs would be beneficial:

- A. Traffic volume at or near capacity,
- B. Complex interchange design,
- C. Three or more lanes in each direction,
- D. Restricted sight distance,
- E. Closely-spaced interchanges,
- F. Multi-lane exits,
- G. Large percentage of trucks,
- H. Street lighting background,
- I. High-speed traffic,
- J. Consistency of sign message location through a series of interchanges,
- K. Insufficient space for post-mounted signs,

L. Junction of two freeways, and
M. Left exit ramps.

04 Over-crossing structures may be used to support overhead signs.

Support:
05 Under some circumstances, the use of over-crossing structures as sign supports might be the only practical solution that will provide adequate viewing distance. The use of such structures as sign supports might eliminate the need for the foundations and sign supports along the roadside.

Section 2A.18 Mounting Height

Standard:
01 **The provisions of this Section shall apply unless specifically stated otherwise for a particular sign or object marker elsewhere in this Manu**

Support:
02 The mounting height requirements for object markers are provided in Chapter 2C.

03 In addition to the provisions of this Section, information affecting the minimum mounting height of signs as a function of crash performance can be found in AASHTO's "Roadside Design Guide" (see Section 1A.11).

Standard:
04 **The minimum height, measured vertically from the bottom of the sign to the elevation of the near edge of the pavement, of signs installed the side of the road in rural areas shall be 5 feet (see Figure 2A-2).**

05 **The minimum height, measured vertically from the bottom of the sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the sign to the elevation of the near edge of the traveled way, of signs installed at the side of the road in business, commercial, or residential areas where parking or pedestrian movements are likely to occur, or where the view of the sign might be obstructe shall be 7 feet (see Figure 2A-2).**

Option:
06 The height to the bottom of a secondary sign mounted below another sign may be 1 foot less than the height specified in Paragraphs 4 and 5.

Standard:
07 **The minimum height, measured vertically from the bottom of the sign to the sidewalk, of signs installed above sidewalks shall be 7 feet.**

08 **If the bottom of a secondary sign that is mounted below another sign is mounted lower than 7 feet above a pedestrian sidewalk or pathwa (see Section 6D.02), the secondary sign shall not project more than 4 inches into the pedestrian facility.**

Option:
09 Signs that are placed 30 feet or more from the edge of the traveled way may be installed with a minimum height of 5 feet, measured vertically from the bottom of the sign to the elevation of the near edge of the pavement.

Standard:
10 **Directional signs on freeways and expressways shall be installed with a minimum height of 7 feet, measured vertically from the bottom of sign to the elevation of the near edge of the pavement. All route signs, warning signs, and regulatory signs on freeways and expressways shal installed with a minimum height of 7 feet, measured vertically from the bottom of the sign to the elevation of the near edge of the pavement. secondary sign is mounted below another sign on a freeway or expressway, the major sign shall be installed with a minimum height of 8 feet the secondary sign shall be installed with a minimum height of 5 feet, measured vertically from the bottom of the sign to the elevation of the edge of the pavement.**

11 **Where large signs having an area exceeding 50 square feet are installed on multiple breakaway posts, the clearance from the ground to th bottom of the sign shall be at least 7 feet.**

Option:
12 A route sign assembly consisting of a route sign and auxiliary signs (see Section 2D.31) may be treated as a single sign for the purposes of this Section.

13 The mounting height may be adjusted when supports are located near the edge of the right-of-way on a steep backslope in order to avoid the sometimes le desirable alternative of placing the sign closer to the roadway.

Standard:
14 **Overhead signs shall provide a vertical clearance of not less than 17 feet to the sign, light fixture, or sign bridge over the entire width of t pavement and shoulders except where the structure on which the overhead signs are to be mounted or other structures along the roadway nea the sign structure have a lesser vertical clearance.**

Option:
15 If the vertical clearance of other structures along the roadway near the sign structure is less than 16 feet, the vertical clearance to an overhead sign struct or support may be as low as 1 foot higher than the vertical clearance of the other structures in order to improve the visibility of the overhead signs.

16 In special cases it may be necessary to reduce the clearance to overhead signs because of substandard dimensions in tunnels and other major structures su as double-deck bridges.

Support:
17 Figure 2A-2 illustrates some examples of the mounting height requirements contained in this Section.

Section 2A.19 Lateral Offset

Standard:
01 **For overhead sign supports, the minimum lateral offset from the edge of the shoulder (or if no shoulder exists, from the edge of the pavement) to the near edge of overhead sign supports (cantilever or sign bridges) shall be 6 feet. Overhead sign supports shall have a barrier crash cushion to shield them if they are within the clear zone.**

02 **Post-mounted sign and object marker supports shall be crashworthy (breakaway, yielding, or shielded with a longitudinal barrier or crash cushion) if within the clear zone.**

Guidance:
03 *For post-mounted signs, the minimum lateral offset should be 12 feet from the edge of the traveled way. If a shoulder wider than 6 feet exists, the minimu lateral offset for post-mounted signs should be 6 feet from the edge of the shoulder.*

Support:
04 The minimum lateral offset requirements for object markers are provided in Chapter 2C.

05 The minimum lateral offset is intended to keep trucks and cars that use the shoulders from striking the signs or supports.

Guidance:
06 *All supports should be located as far as practical from the edge of the shoulder. Advantage should be taken to place signs behind existing roadside barriers,*

over-crossing structures, or other locations that minimize the exposure of the traffic to sign supports.

Option:
07 Where permitted, signs may be placed on existing supports used for other purposes, such as highway traffic signal supports, highway lighting supports, and utility poles.

Standard:
08 **If signs are placed on existing supports, they shall meet other placement criteria contained in this Manual.**

Option:
09 Lesser lateral offsets may be used on connecting roadways or ramps at interchanges, but not less than 6 feet from the edge of the traveled way.

10 On conventional roads in areas where it is impractical to locate a sign with the lateral offset prescribed by this Section, a lateral offset of at least 2 feet ma used.

11 A lateral offset of at least 1 foot from the face of the curb may be used in business, commercial or residential areas where sidewalk width is limited or whe existing poles are close to the curb.

Guidance:
12 *Overhead sign supports and post-mounted sign and object marker supports should not intrude into the usable width of a sidewalk or other pedestrian facilit*

Support:
13 Figures 2A-2 and 2A-3 illustrate some examples of the lateral offset requirements contained in this Section.

Section 2A.20 Orientation

Guidance:
01 *Unless otherwise provided in this Manual, signs should be vertically mounted at right angles to the direction of, and facing, the traffic that they are intende serve.*

02 *Where mirror reflection from the sign face is encountered to such a degree as to reduce legibility, the sign should be turned slightly away from the road. Si that are placed 30 feet or more from the pavement edge should be turned toward the road. On curved alignments, the angle of placement should be determinec the direction of approaching traffic rather than by the roadway edge at the point where the sign is located.*

Option:
03 On grades, sign faces may be tilted forward or back from the vertical position to improve the viewing angle.

Section 2A.21 Posts and Mountings

Standard:
01 **Sign posts, foundations, and mountings shall be so constructed as to hold signs in a proper and permanent position, and to resist swaying i the wind or displacement by vandalism.**

Support:
02 The latest edition of AASHTO's "Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" contains additional information regarding posts and mounting (see Page i for AASHTO's address).

Option:
03 Where engineering judgment indicates a need to draw attention to the sign during nighttime conditions, a strip of retroreflective material may be used on regulatory and warning sign supports.

Standard:
04 **If a strip of retroreflective material is used on the sign support, it shall be at least 2 inches in width, it shall be placed for the full length o the support from the sign to within 2 feet above the edge of the roadway, and its color shall match the background color of the sign, except th the color of the strip for the YIELD and DO NOT ENTER signs shall be red.**

Section 2A.22 Maintenance

Guidance:
01 *Maintenance activities should consider proper position, cleanliness, legibility, and daytime and nighttime visibility (see Section 2A.09). Damaged or deterior signs, gates, or object markers should be replaced.*

02 *To assure adequate maintenance, a schedule for inspecting (both day and night), cleaning, and replacing signs, gates, and object markers should be established. Employees of highway, law enforcement, and other public agencies whose duties require that they travel on the roadways should be encouraged to report any damaged, deteriorated, or obscured signs, gates, or object markers at the first opportunity.*

03 *Steps should be taken to see that weeds, trees, shrubbery, and construction, maintenance, and utility materials and equipment do not obscure the face of a sign or object marker.*

04 *A regular schedule of replacement of lighting elements for illuminated signs should be maintained.*

Section 2A.23 Median Opening Treatments for Divided Highways with Wide Medians

Guidance:
01 *Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings should be signed as two separat intersections.*

Back to Top

EXHIBIT “D”

BELDEN IMSA CATALOG

ATTACHED

BELDEN
SENDING ALL THE RIGHT SIGNALS

INTERNATIONAL
MUNICIPAL SIGNAL
ASSOCIATION
(IMSA) CABLES

IMSA Catalog

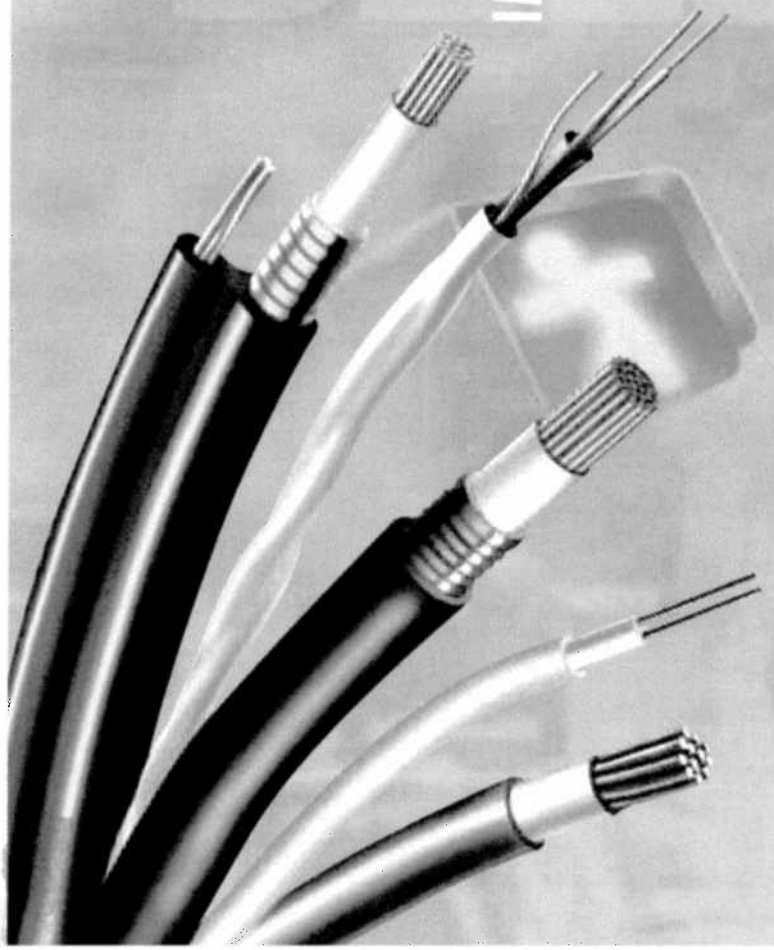


Table of Contents

And Cable Selection Guide

*Available upon special request.

Spec 19-1 and 20-1 Signal Cable

Product Specifications

Conductors	Solid or Stranded Bare Copper
Insulation	Polyethylene
Color Code	Per Specification
Conductor Configuration	Cabled Conductors
Shield	None
Jacket	
Spec 19-1	PVC
Spec 20-1	Black PE

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
IMSA Spec 19-1									
601455	2	14	solid	.325	8.26	.045	1.14	58	86
601457	2	14	7 strand	.341	8.66	.045	1.14	63	94
601176	3	14	solid	.342	8.69	.045	1.14	75	112
601203	3	14	7 strand	.357	9.07	.045	1.14	81	121
601321	4	14	solid	.372	9.45	.045	1.14	94	140
601137	4	14	7 strand	.389	9.89	.045	1.14	98	146
601177	5	14	solid	.406	10.31	.045	1.14	113	168
601204	5	14	7 strand	.420	10.67	.045	1.14	113	168
601179	7	14	solid	.440	11.18	.045	1.14	146	217
601205	7	14	7 strand	.464	11.79	.045	1.14	154	229
601180	9	14	solid	.511	12.98	.045	1.14	186	277
601352	9	14	7 strand	.571	14.50	.060	1.52	212	315
601181	10	14	solid	.586	14.88	.060	1.52	220	327
601206	10	14	7 strand	.586	14.88	.060	1.52	227	338
601948	11	14	7 strand	.618	15.70	.060	1.52	250	372
601182	12	14	solid	.603	15.31	.060	1.52	254	378
601207	12	14	7 strand	.636	16.15	.060	1.52	267	397
601208	14	14	7 strand	.668	16.97	.060	1.52	304	452
601671	15	14	solid	.667	16.94	.060	1.52	311	463
601539	15	14	7 strand	.704	17.88	.060	1.52	328	488
601415	16	14	solid	.667	16.94	.060	1.52	325	484
601320	16	14	7 strand	.704	17.88	.060	1.52	341	507
601826	19	14	solid	.701	17.81	.060	1.52	375	558
601480	19	14	7 strand	.741	18.82	.060	1.52	393	585
601633	20	14	solid	.737	18.72	.060	1.52	395	588
601443	20	14	7 strand	.779	19.79	.060	1.52	415	617
601209	21	14	7 strand	.779	19.79	.060	1.52	432	643
601534	25	14	solid	.796	20.22	.060	1.52	478	711
601890	25	14	7 strand	.918	23.32	.080	1.52	544	809
601334	2	12	solid	.382	9.70	.045	1.14	58	86
601448	2	12	7 strand	.397	10.08	.045	1.14	87	129

continued...

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
IMSA Spec 19-1 *(continued)*									
601456	3	12	solid	.398	10.11	.045	1.14	108	161
601431	3	12	7 strand	.420	10.67	.045	1.14	113	168
601189	4	12	solid	.439	11.15	.045	1.14	135	201
601466	4	12	7 strand	.459	11.66	.045	1.14	141	210
601190	5	12	solid	.480	12.19	.045	1.14	163	243
601410	5	12	7 strand	.503	12.78	.045	1.14	172	256
601192	7	12	solid	.555	14.10	.060	1.52	237	353
601213	7	12	7 strand	.579	14.71	.060	1.52	244	363
601193	9	12	solid	.640	16.26	.060	1.52	281	418
601468	9	12	7 strand	.673	17.09	.060	1.52	310	461
601930	10	12	7 strand	.726	18.44	.060	1.52	338	503
601496	12	12	solid	.711	18.06	.060	1.52	372	553
601214	12	12	7 strand	.753	19.13	.060	1.52	393	585
601358	16	12	solid	.793	20.14	.060	1.52	449	668
581719	19	12	7 strand	.918	23.32	.080	2.03	625	930
601578	20	12	solid	.922	23.42	.080	2.03	631	939
601591	2	10	solid	.421	10.70	.045	1.14	110	164
603061	2	10	7 strand	.443	11.25	.045	1.14	118	176
601570	3	10	solid	.445	11.30	.045	1.14	150	223
603314	3	10	7 strand	.469	11.91	.045	1.14	155	231
581665	4	10	7 strand	.542	13.77	.060	1.52	216	321
580314	5	10	7 strand	.596	15.14	.060	1.52	263	391
IMSA Spec 20-1									
582015	5	18	7 strand	.354	8.99	.045	1.14	60	89
582024	2	16	solid	.299	7.59	.045	1.14	39	58
581761	7	16	7 strand	.419	10.64	.045	1.14	102	152
582021	20	16	7 strand	.696	17.68	.060	1.52	278	414
601140	2	14	solid	.250	6.35	.045	1.14	52	77
601194	2	14	7 strand	.341	8.66	.045	1.14	55	82
601141	3	14	solid	.342	8.69	.045	1.14	66	98
601195	3	14	7 strand	.359	9.12	.045	1.14	71	106
601142	4	14	solid	.372	9.45	.045	1.14	85	126
601196	4	14	7 strand	.391	9.93	.045	1.14	88	131
601143	5	14	solid	.406	10.31	.045	1.14	103	153
601197	5	14	7 strand	.430	10.92	.045	1.14	108	161
601144	6	14	solid	.440	11.18	.045	1.14	118	176
603131	6	14	7 strand	.464	11.79	.045	1.14	127	189
601145	7	14	solid	.440	11.18	.045	1.14	136	202
601198	7	14	7 strand	.464	11.79	.045	1.14	141	210
601146	8	14	solid	.476	12.09	.045	1.14	155	231
601610	8	14	7 strand	.507	12.88	.045	1.14	160	238
601147	9	14	solid	.511	12.98	.045	1.14	172	256
601429	9	14	7 strand	.571	14.50	.060	1.52	192	286
601148	10	14	solid	.586	14.88	.060	1.52	197	293
601199	10	14	7 strand	.592	15.04	.060	1.52	205	305
601150	12	14	solid	.603	15.32	.060	1.52	232	345
601200	12	14	7 strand	.636	16.15	.060	1.52	244	363

continued...

Spec 19-1 and 20-1 Signal Cable *(continued)*

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
IMSA Spec 20-1 *(continued)*									
580307	14	14	7 strand	.668	16.97	.060	1.52	280	417
601153	15	14	solid	.667	16.94	.060	1.52	284	423
601331	15	14	7 strand	.704	17.88	.060	1.52	302	449
601154	16	14	solid	.667	16.94	.060	1.52	299	445
601201	16	14	7 strand	.704	17.88	.060	1.52	316	470
601157	19	14	solid	.701	17.81	.060	1.52	348	518
601454	19	14	7 strand	.741	18.82	.060	1.52	366	545
601158	20	14	solid	.737	18.72	.060	1.52	370	550
601202	20	14	7 strand	.779	19.79	.060	1.52	387	576
603870	21	14	solid	.737	18.72	.060	1.52	384	571
582020	21	14	7 strand	.779	19.79	.060	1.52	405	603
601594	25	14	solid	.796	20.22	.060	1.52	450	670
581694	26	14	7 strand	.925	23.50	.080	1.52	518	771
601411	2	12	solid	.384	9.75	.045	1.14	74	110
601210	2	12	7 strand	.397	10.08	.045	1.14	74	110
601412	3	12	solid	.402	10.21	.045	1.14	99	147
601211	3	12	7 strand	.420	10.67	.045	1.14	103	153
601417	4	12	solid	.440	11.18	.045	1.14	124	184
601467	4	12	7 strand	.459	11.66	.045	1.14	130	193
601322	5	12	solid	.480	12.19	.045	1.14	152	226
601325	5	12	7 strand	.503	12.78	.045	1.14	159	237

continued...

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
IMSA Spec 20-1 *(continued)*									
601186	7	12	solid	.561	14.25	.060	1.52	212	315
601326	7	12	7 strand	.579	14.71	.060	1.52	222	330
601475	9	12	7 strand	.677	17.20	.060	1.52	284	423
601518	10	12	solid	.690	17.52	.060	1.52	296	440
601316	10	12	7 strand	.686	17.42	.060	1.52	309	460
601188	12	12	solid	.711	18.06	.060	1.52	346	515
601212	12	12	7 strand	.753	19.13	.060	1.52	367	546
601329	16	12	7 strand	.876	22.25	.080	2.03	501	745
601563	19	12	7 strand	.929	23.60	.080	2.03	582	866
601583	20	12	7 strand	.976	24.80	.080	2.03	618	919
601900	21	12	7 strand	.976	24.80	.080	2.03	643	957
580106	25	12	7 strand	1.080	27.43	.080	2.03	751	1117
601540	2	10	7 strand	.443	11.25	.045	1.14	107	159
581356	3	10	solid	.429	10.90	.045	1.14	135	201
601569	4	10	7 strand	.514	13.06	.045	1.14	185	275
601820	7	10	7 strand	.648	16.46	.060	1.52	321	478
601605	2	8	solid	.475	12.07	.045	1.14	146	217
601430	2	8	19 strand	.505	12.83	.045	1.14	150	223
603298	3	8	19 strand	.508	12.90	.045	1.14	195	290
581710	7	8	solid	.696	17.68	.060	1.52	454	675

Other conductor counts and AWG sizes (solid or stranded) available upon request.

Spec 19-2 and 20-2 Signal and Communications Cable

Product Specifications

Conductors	Solid or Stranded Bare Copper
Insulation	Polyethylene
Color Code	Per Specification
Conductor Configuration	Twisted Pairs
Shield	Corrugated Copper Tape
Jacket	
Spec 19-2	PVC
Spec 20-2	Black PE

Part No.	No. of Pairs	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
IMSA Spec 19-2									
601324	1	14	7 strand	.410	10.41	.045	1.14	87	129
IMSA Spec 20-2									
580902	5	19	7 strand	.600	15.24	.060	1.52	138	205
601622	6	19	solid	.626	15.90	.060	1.52	152	226
601530	6	19	7 strand	.666	16.92	.060	1.52	160	238
601510	3	16	solid	.590	14.99	.060	1.52	135	201
601227	6	16	solid	.740	18.80	.060	1.52	343	510
601446	12	16	solid	.940	23.88	.080	2.03	406	604
601428	25	16	solid	1.280	32.51	.080	2.03	740	1101
601481	3	14	solid	.640	16.26	.060	1.52	173	257
603723	4	14	solid	.690	17.53	.060	1.52	212	315
601617	6	14	solid	.880	22.35	.080	2.03	317	472

Other pair counts and AWG sizes (solid or stranded) available upon request.

Spec 19-3 and 20-3 Self-supporting Signal Cable

Product Specifications

Conductors	Solid or Stranded Bare Copper
Insulation	Polyethylene
Color Code	Per Specification
Conductor Configuration	Cabled Conductors
Shield	None
Integrated Messenger▲	1/4" (.250") 7-wire extra high strength (6,650 lb. test) flooded galvanized steel strand
Jacket	
Spec 19-3	PVC
Spec 20-3	Black PE

▲Utilizes 0.134" (3.4mm) *solid* extra high strength (2,800 lb. test) galvanized steel wire which is permitted for cables 12 AWG, 3 conductors or less, or 14 AWG, 4 conductors or less.

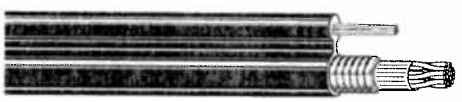
Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./1000	Kg/Km
IMSA Spec 19-3									
581722▲	4	14	solid	.383 x .737	9.73 x 18.7	.045	1.14	170	253
603234	7	14	7 strand	.475 x .945	12.1 x 24.0	.045	1.14	321	478
603407	9	14	solid	.520 x .990	13.2 x 25.2	.045	1.14	356	530
581857▲	2	12	7 strand	.405 x .759	10.3 x 19.3	.045	1.14	170	253
581854	5	12	7 strand	.511 x .981	13.0 x 24.9	.045	1.14	220	327
IMSA Spec 20-3									
603515	3	14	7 strand	.361 x .825	9.17 x 21.0	.045	1.14	221	329
601850	4	14	solid	.377 x .841	9.58 x 21.4	.045	1.14	285	424
601928▲	4	14	solid	.383 x .737	9.73 x 18.7	.045	1.14	194	289
601216	5	14	solid	.410 x .874	10.4 x 22.2	.045	1.14	256	381
601217	7	14	solid	.445 x .909	11.3 x 23.1	.045	1.14	289	430
601491	7	14	7 strand	.469 x .933	11.9 x 23.7	.045	1.14	295	439
601337	9	14	solid	.517 x .981	13.1 x 24.9	.045	1.14	328	488
601218	10	14	solid	.593 x 1.057	15.1 x 26.9	.060	1.52	355	528
603804	10	14	7 strand	.590 x 1.060	15.0 x 26.9	.060	1.52	366	545
601437	12	14	solid	.610 x 1.077	15.5 x 27.4	.060	1.52	388	577
601338	16	14	solid	.670 x 1.140	17.0 x 29.0	.060	1.52	456	678
601219	20	14	solid	.745 x 1.209	18.9 x 30.7	.060	1.52	528	786
603458	3	12	7 strand	.418 x .883	10.6 x 22.4	.045	1.14	258	384
601479	5	12	solid	.480 x .944	12.2 x 24.0	.045	1.14	307	457
601472	7	12	solid	.519 x .983	13.2 x 25.0	.045	1.14	356	530
603730	7	12	7 strand	.546 x 1.010	13.9 x 25.7	.060	1.52	362	539
601587	12	12	solid	.711 x 1.175	18.1 x 29.9	.060	1.52	502	747

Other conductor counts and AWG sizes (solid or stranded) available upon request.

Spec 19-4 and 20-4 Self-supporting Signal and Communications Cable

Product Specifications

Conductors	Solid or Stranded Bare Copper
Insulation	Polyethylene
Color Code	Per Specification
Conductor Configuration	Twisted Pairs
Shield	Corrugated Copper Tape
Integrated Messenger	1/4" (.250") 7-wire extra high strength (6,650 lb. test) flooded galvanized steel strand
Jacket	
Spec 19-4	PVC
Spec 20-4	Black PE



Part No.	No. of Pairs	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./1000	Kg/Km
IMSA Spec 19-4									
581967	3	16	7 strand	.626 x 1.096	15.9 x 27.8	.060	1.52	340	506
IMSA Spec 20-4									
582018	5	19	7 strand	.606 x 1.076	15.4 x 27.3	.060	1.52	298	443
603668	6	19	7 strand	.666 x 1.136	16.9 x 28.9	.045	1.14	315	469
581570	2	16	solid	.566 x 1.036	14.4 x 26.3	.060	1.52	267	397
601339	3	16	solid	.586 x 1.056	14.9 x 26.8	.060	1.52	292	434
581959	3	16	7 strand	.626 x 1.096	15.9 x 27.8	.060	1.52	298	443
601340	6	16	solid	.686 x 1.156	17.4 x 29.4	.060	1.52	374	556
601500	4	14	7 strand	.736 x 1.206	18.7 x 30.6	.060	1.52	380	565

Other pair counts and AWG sizes (solid or stranded) available upon request.

Spec 19-5 and 20-5 Signal Cable

Product Specifications

Conductors	Solid or Stranded Bare Copper
Insulation	Polyethylene
Color Code	Per Specification
Conductor Configuration	Cabled Conductors
Shield	Corrugated Copper Tape
Inner Jacket	Polyethylene
Outer Jacket	
Spec 19-5	PVC
Spec 20-5	Black PE

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Inner Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
IMSA Spec 19-5									
603164	4	14	solid	.566	14.38	.041	1.04	168	250
IMSA Spec 20-5									
601221	4	14	solid	.566	14.38	.041	1.04	150	223
580708	3	10	7 strand	.666	16.92	.045	1.14	220	327
603057	4	10	solid	.684	17.37	.045	1.14	267	397

Minimum average outer jacket thickness is .060 inches (1.52mm).

Other conductor counts and AWG sizes (solid or stranded) available upon request.

Spec 19-6 and 20-6 Signal Communications Cable

Product Specifications

Conductors	Solid or Stranded Bare Copper
Insulation	Polyethylene
Color Code	Per Specification
Conductor Configuration	Twisted Pairs
Shield	Corrugated Copper Tape
Inner Jacket	Polyethylene
Outer Jacket	
Spec 19-6	PVC
Spec 20-6	Black PE

Part No.	No. of Pairs	AWG	Solid or Stranded	Nominal OD		Min. Avg. Inner Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
IMSA Spec 19-6									
581978	2	16	solid	.650	16.51	.041	1.52	211	314
601460	2	14	solid	.685	17.40	.041	1.52	196	292
IMSA Spec 20-6									
581922	3	19	solid	.616	15.65	.041	1.04	130	193
581329	2	18	7 strand	.626	15.90	.041	1.04	126	187
580088	6	18	solid	.736	18.69	.041	1.04	209	311
580065	6	18	7 strand	.786	19.96	.041	1.04	218	324
601222	3	16	solid	.650	16.51	.041	1.04	166	247
601458	6	16	solid	.795	20.19	.041	1.04	252	375

Minimum average outer jacket thickness is .060 inches (1.52mm).

Other pair counts and AWG sizes (solid or stranded) available upon request.

Spec 39-6 and 40-6 Communications Cable

Spec 39-6 Communications Cable is available upon special request.

Product Specifications

Conductors	Solid or Stranded Bare Copper
Insulation	Polyethylene
Color Code	Per Specification
Conductor Configuration	Twisted Pairs
Shield	Corrugated Copper Tape
Inner Jacket	Polyethylene
Outer Jacket	
Spec 39-6	PVC
Spec 40-6	Black PE

Part No.	No. of Pairs	AWG	Solid or Stranded	Nominal OD		Min. Avg. Outer Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
IMSA Spec 40-6									
603414	12	19	solid	.756	19.20	.060	1.52	248	369
603569	18	19	solid	.890	22.61	.080	2.03	352	524

Minimum average inner jacket thickness is .041 inches (1.04mm).

Other pair counts and AWG sizes (solid or stranded) available upon request.

Spec 39-2 and 40-2 Communications Cable

Product Specifications

Conductors	Solid or Stranded Bare Copper
Insulation	Polyethylene
Color Code	Per Specification
Conductor Configuration	Twisted Pairs
Shield	Corrugated Copper Tape
Jacket	
Spec 39-2	PVC
Spec 40-2	Black PE

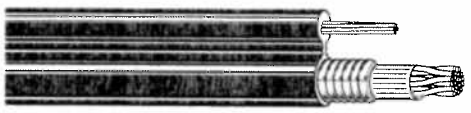
Part No.	No. of Pairs	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
IMSA Spec 39-2									
580481	3	19	solid	.422	10.72	.045	1.14	87	129
581718	3	19	7 strand	.454	11.53	.045	1.14	91	135
603434	6	19	solid	.510	12.95	.045	1.14	132	196
581164	12	19	7 strand	.686	17.42	.060	1.52	237	353
581855	3	16	7 strand	.586	14.89	.060	1.52	154	229
581751	12	16	solid	.890	22.61	.080	2.03	415	617
581258	25	16	solid	1.140	28.96	.080	2.03	744	1107
IMSA Spec 40-2									
603555	3	19	solid	.424	10.77	.045	1.14	77	115
580125	3	19	7 strand	.444	11.28	.045	1.14	80	119
580382	4	19	solid	.504	12.80	.045	1.14	93	138
580040	4	19	7 strand	.480	12.19	.045	1.14	93	138
603385	6	19	solid	.565	14.35	.060	1.52	132	196
580120	6	19	7 strand	.514	13.06	.045	1.14	119	177
603480	12	19	solid	.666	16.92	.060	1.52	205	305
603403	25	19	solid	.820	20.82	.060	1.52	369	549
603482	25	19	7 strand	1.010	25.65	.080	2.03	422	628
603104	6	16	solid	.666	16.92	.060	1.52	200	298
603994	6	16	7 strand	.683	17.35	.060	1.52	208	309
603223	12	16	solid	.890	22.60	.080	2.03	365	543

Other pair counts and AWG sizes (solid or stranded) available upon request.

Spec 39-4 and 40-4 Communications Cable

Product Specifications

Conductors	Solid or Stranded Bare Copper
Insulation	Polyethylene
Color Code	Per Specification
Conductor Configuration	Twisted Pairs
Shield	Corrugated Copper Tape
Integrated Messenger	1/4" (.250") 7-wire extra high strength (6,650 lb. test) flooded galvanized steel strand
Jacket	
Spec 39-4	PVC
Spec 40-4	Black PE



Part No.	No. of Pairs	AWG	Solid or Stranded	Nominal OD Inches/ (mm)	Min. Avg. Jacket Thickness Inches	mm	Approx. Weight Lbs./ 1000'	Kg/ Km
IMSA Spec 39-4								
603343	6	19	solid	.520 x .990 (13.21 x 25.15)	.060	1.52	306	455
IMSA Spec 40-4								
603680	3	19	solid	.430 x .900 (10.92 x 22.86)	.045	1.14	229	341
603155	6	19	solid	.520 x .990 (13.21 x 25.15)	.045	1.14	276	411
603149	12	19	solid	.666 x 1.360 (16.92 x 34.55)	.060	1.52	355	528
580950	12	19	7 strand	.686 x 1.156 (17.42 x 29.36)	.060	1.52	371	552
603568	18	19	solid	.756 x 1.230 (19.20 x 31.24)	.060	1.52	442	658
581735	6	18	7 strand	.626 x 1.096 (15.90 x 27.84)	.060	1.52	325	484
601975	6	16	solid	.666 x 1.136 (16.92 x 28.85)	.060	1.52	355	528
603993	6	16	7 strand	.686 x 1.156 (17.42 x 29.36)	.060	1.52	340	506

Other pair counts and AWG sizes (solid or stranded) available upon request.

Spec 26-3 and 28-3 Aerial Self-Supporting Cable

Product Specifications

Conductors	
Spec 26-3	Solid Hard Drawn Bare Copper
Spec 28-3	Solid Copper Clad Steel
Insulation	Black High-Density Polyethylene (HDPE)
Conductor Configurations	Single Conductor

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD Inches/ (mm)	Min. Avg. Jacket Thickness Inches	mm	Approx. Weight Lbs./ 1000'	Kg/ Km
IMSA Spec 26-3								
601499	1	10	solid	.163 (4.14)	.030	.76	37	55
IMSA Spec 28-3								
601224	1	12	solid	.140 (3.56)	.027	.69	23	34
601223	1	10	solid	.162 (4.11)	.027	.69	35	52

Other AWG sizes available upon request.

Spec 29-1, 29-2, 29-3 and 29-4 Aerial Self-Supporting "C" Wire

Product Specifications

Conductors	
Spec 29-1, 29-3	Solid Hard Drawn Bare Copper
Spec 29-2, 29-4	Solid Copper Clad Steel
Insulation	Black High-Density Polyethylene (HDPE)
Conductor Configurations	Two Conductors Parallel
Outer Jacket	
Spec 29-3, 29-4	Red Fade-Resistant PVC

Spec 29-1, Spec 29-2

Spec 29-3, Spec 29-4

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD Inches/ (mm)	Min. Avg. Jacket Thickness Inches	mm	Approx. Weight Lbs./ 1000'	Kg/ Km
IMSA Spec 29-1								
601364	2	12	solid	.175 x .317 (4.45 x 8.05)	.045	1.14	56	83
IMSA Spec 29-2								
601257	2	14	solid	.155 x .283 (3.94 x 7.19)	.040	1.02	37	55
601256	2	12	solid	.170 x .317 (4.32 x 8.05)	.040	1.02	52	77
IMSA Spec 29-3								
601803	2	14	solid	.215 x .343 (5.46 x 8.71)	.027	.69	55	82
601406	2	12	solid	.235 x .377 (5.97 x 9.58)	.027	.69	74	110
601450	2	10	solid	.268 x .440 (6.81 x 11.18)	.033	.83	108	161
IMSA Spec 29-4								
601259	2	14	solid	.215 x .343 (5.46 x 8.71)	.027	.69	53	79
601258	2	12	solid	.235 x .377 (5.97 x 9.58)	.027	.69	70	104

14 AWG IMSA 29-1 available upon request.

Spec 50-2 Loop Detector Wire

Product Specifications

Conductors	Solid or Stranded Tinned Copper
Insulation	Polyethylene
Color Code	Black/Natural
Conductor Configuration	Twisted Pair
Shield	Aluminum/Mylar Tape
Outer Jacket	Black Low-Density Polyethylene

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
IMSA Spec 50-2									
603980	2	18	16 strand	.285	7.24	.030	.76	35	52
603133	2	16	19 strand	.309	7.85	.030	.76	39	58
601765	2	14	19 strand	.330	8.38	.030	.76	50	74
581061	2	14	19 strand	.360	9.14	.045	1.14	57	85
603378	2	12	19 strand	.382	9.70	.030	.76	76	113

Solid conductors available upon request.

Spec 51-1 and 51-3 Loop Detector Wire

Spec 51-1 Loop Detector Wire is available upon special request.

Product Specifications

Conductors	Solid or Stranded Bare Copper
Insulation	
Spec 51-1	PVC/Nylon
Spec 51-3	Black Cross-linked Polyethylene
Conductor Configuration	Single Conductor

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
IMSA Spec 51-3									
582100	1	14	19 strand	.136	3.45	.030	.76	17	25

Other AWG sizes (solid or stranded) available upon request.

Spec 51-5 and 51-7 Loop Detector Wire

Product Specifications

Conductors	Stranded Bare Copper
Insulation	
Spec 51-5	PVC/Nylon
Spec 51-7	Black Cross-linked Polyethylene
Conductor Configuration	Single Conductor
Outer Jacket	Black PVC or Polyethylene Tube

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
IMSA Spec 51-5 (PVC Tube)									
580206	1	14	19 strand	.250	6.35	.030	.76	27	40
580706	1	12	19 strand	.250	6.35	.030	.76	36	54
IMSA Spec 51-5 (PE Tube)									
580263	1	14	19 strand	.250	6.35	.030	.76	29	43
582116	1	12	19 strand	.250	6.35	.030	.76	39	58
IMSA Spec 51-7 (PVC Tube)									
581923	1	14	19 strand	.250	6.35	.030	.76	31	46
IMSA Spec 51-7 (PE Tube)									
582115	1	14	19 strand	.250	6.35	.030	.76	33	49

12 AWG 51-7 available upon request.

CALTRANS Type 2 Traffic Loop Wire (Spec 51-5 and 51-7)

Product Specifications

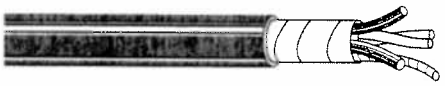
Conductors	Stranded Bare Copper
Insulation	
Spec 51-5	PVC/Nylon
Spec 51-7	Black Cross-linked Polyethylene
Conductor Configuration	Single Conductor
Outer Jacket	Black PVC or Polyethylene Tube

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
CALTRANS Type 2 / IMSA Spec 51-5 (PVC Tube)									
580206	1	14	19 strand	.250	6.35	.030	.76	27	40
CALTRANS Type 2 / IMSA Spec 51-5 (PE Tube)									
580263	1	14	19 strand	.250	6.35	.030	.76	29	43
CALTRANS Type 2 / IMSA Spec 51-7 (PVC Tube)									
581923	1	14	19 strand	.250	6.35	.030	.76	31	46
CALTRANS Type 2 / IMSA Spec 51-7 (PE Tube)									
582115	1	14	19 strand	.250	6.35	.030	.76	33	49

CALTRANS Type B Lead-In Cable

Product Specifications

Conductors	Stranded Tinned Copper
Insulation	Black High-Density Polyethylene
Color Code	Black/Natural
Conductor Configuration	Twisted Pair
Shield	Aluminum/Mylar Tape
Outer Jacket	Black High-Density Polyethylene



Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
CALTRANS Type B									
603916	2	16	19 strand	.275	6.99	.033	.84	40	60

CALTRANS Type C Lead-In Cable (Spec 50-2)

Product Specifications

Conductors	Stranded Tinned Copper
Insulation	Polyethylene
Color Code	Black/Natural
Conductor Configuration	Twisted Pair
Shield	Aluminum/Mylar Tape
Outer Jacket	Black Low-Density Polyethylene

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
CALTRANS Type C / IMSA Spec 50-2									
603133	2	16	19 strand	.309	7.85	.030	.76	39	58

CALTRANS Signal Cable

Product Specifications

Conductors	Solid Bare Copper
Insulation	PVC/Nylon
Color Code	Per Specification
Conductor Configuration	Cabled Conductors
Outer Jacket	Black Low-Density Polyethylene

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
CALTRANS Signal Cable									
580228 3CSC	3	14	solid	.321	8.15	.045	1.14	67	100
580229 5CSC	5	14	solid	.380	9.65	.045	1.14	101	150
580374 9CSC	1 +8	12 14	solid	.508	12.90	.060	1.52	184	274
580157 12CSC	1 +11	12 14	solid	.580	14.73	.060	1.52	251	373
580159 28CSC	1 +27	10 14	solid	.833	21.16	.080	2.03	527	784

Vehicle Detector Cable

Product Specifications

Conductors	Stranded Bare Copper
Insulation	High-Density Polyethylene
Color Code	Black, Red, White, Green
Conductor Configuration	Cabled Conductors
Shield	
Part No. 7992A	Aluminum/Mylar Tape
Part No. 7993A	Unshielded
Outer Jacket	Black High-Density Polyethylene
Filled	Yes

Shielded

Unshielded

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
Vehicle Detector Cable									
7992A	4	18	7 strand	.234	5.94	.024	.61	37	55
7993A	4	18	7 strand	.218	5.54	.024	.61	35	52

Optical Detector Cable

Product Specifications

Conductors	Stranded Tinned Copper
Insulation	High-Density Polyethylene
Color Code	Yellow, Blue, Orange
Conductor Configuration	Cabled Conductors
Shield	Aluminum/Mylar Tape
Outer Jacket	Black UV Resistant PVC

Suitable for Direct Burial and Aerial use (messenger wire required).

Part No.	No. of Cond.	AWG	Solid or Stranded	Nominal OD		Min. Avg. Jacket Thickness		Approx. Weight	
				Inches	mm	Inches	mm	Lbs./ 1000'	Kg/ Km
Optical Detector Cable, 600V									
580461	3	20	7 strand	.280	7.11	.045	1.14	42	62

Color Codes

IMSA Cabled Conductors

Cond. No.	Insulation Color	Stripe Color
1	Black	–
2	White	–
3	Red	–
4	Green	–
5	Orange	–
6	Blue	–
7	White	Black
8	Red	Black
9	Green	Black
10	Orange	Black
11	Blue	Black
12	Black	White
13	Red	White
14	Green	White
15	Blue	White
16	Black	Red
17	White	Red
18	Orange	Red
19	Blue	Red
20	Red	Green
21	Orange	Green
22	Black	–
23	White	–
24	Red	–
25	Green	–

Cables per IMSA Specs:
19-1, 19-3, 19-5, 20-1, 20-3, 20-5

This color code uses only six different insulation colors. Different colored single stripes identify conductors numbered 7 through 21. The sequence is repeated in cables having more than 21 conductors. The repeat sequence conductors are identifiable by their location in the concentric layers of conductors in the cable assembly; the lower conductor numbers being in the center of innermost layers; the higher conductor numbers being in the outer layers.

IMSA Twisted Pairs

Pair No.	Color Combination
1	White & Blue
2	White & Orange
3	White & Green
4	White & Brown
5	White & Slate
6	Red & Blue
7	Red & Orange
8	Red & Green
9	Red & Brown
10	Red & Slate
11	Black & Blue
12	Black & Orange
13	Black & Green
14	Black & Brown
15	Black & Slate
16	Yellow & Blue
17	Yellow & Orange
18	Yellow & Green
19	Yellow & Brown
20	Yellow & Slate
21	Violet & Blue
22	Violet & Orange
23	Violet & Green
24	Violet & Brown
25	Violet & Slate

Cables per IMSA Specs:
19-2, 19-4, 19-6, 20-2, 20-4, 20-6, 39-2, 39-4, 39-6, 40-2, 40-4, 40-6

This color code uses only ten different insulation colors: five for the "wire color" conductors in twisted pairs; five for the "mate color" conductors in twisted pairs. The "wire color" and "mate color" combinations produce twenty-five uniquely color-coded twisted pairs.

CALTRANS 3-Conductor

Cond. No.	Color	Tracer
1	Blue	Black
2	Blue	Orange
3	White	Black

CALTRANS 5-Conductor

Cond. No.	Color	Tracer
1	Red	—
2	Yellow	—
3	Brown	—
4	Black	—
5	White	—

CALTRANS 9-Conductor

Cond. No.	Color	Tracer
1	White	—
2	Red	—
3	Yellow	—
4	Brown	—
5	Red	Black
6	Yellow	Black
7	Brown	Black
8	Black	—
9	White	Black

CALTRANS 12-Conductor

Cond. No.	Color	Tracer
1	White	—
2	Red	—
3	Yellow	—
4	Brown	—
5	Black	—
6	Black	White
7	Black	Red
8	Red	Black
9	Yellow	Black
10	Brown	Black
11	Red	White
12	Brown	White

CALTRANS 28-Conductor

Cond. No.	Color	Tracer
1	White	—
2	Red	Black
3	Yellow	Black
4	Brown	Black
5	Red	Orange
6	Yellow	Orange
7	Brown	Orange
8	Red	Silver
9	Yellow	Silver
10	Brown	Silver
11	Red	Purple
12	Yellow	Purple
13	Brown	Purple
14	White	Black
15	Black	Red
16	Red	(2) Black
17	Brown	(2) Black
18	Red	(2) Orange
19	Brown	(2) Orange
20	Red	(2) Silver
21	Brown	(2) Silver
22	Red	(2) Purple
23	Brown	(2) Purple
24	Blue	Black
25	Blue	Orange
26	Blue	Silver
27	Blue	Purple
28	Black	—

Index

Part Numbers

Cables shown in this catalog were formerly produced by Independent Cable, Inc. (ICI), purchased by Belden Inc. in 1996.

BELDEN
SENDING ALL THE RIGHT SIGNALS

www.belden.com

U.S. Customer Service: **800-BELDEN-1 (800-235-3361)**

UNITED STATES

Division Headquarters–Americas
2200 U.S. Highway 27 South
Richmond, IN 47374
Phone: 765-983-5200
Inside Sales: 800-235-3361
Fax: 765-983-5294
info@belden.com
web: www.belden.com

ASIA/PACIFIC

Australia
Level 10
369 Royal Parade
Parkville, Victoria 3052
Australia
Phone: 613-9341-0900
Fax: 613-9347-8274
australia.sales@belden.com

Beijing
Rm 1015
Office Tower Beijing Capital
Times Square
No. 88 West Changan Ave.
Beijing 100031
People's Republic of China
Phone: 8610-8391-5181-3
Fax: 8610-8391-5186
hongkong.sales@belden.com

Hong Kong
Unit 4401, 44F
Cosco Tower
Grand Millennium Plaza
183 Queen's Road Central
Hong Kong
Phone: 852-2955-0128
Fax: 852-2907-6933
hongkong.sales@belden.com

India
16th Floor, Tower B
Unitech Cyberpark
Sector 39, Gurgaon
Haryana, India
Phone: 91-124-4509999
Fax: 91-124-4509900
india.sales@belden.com

Shanghai
Unit 2605
Harbour Ring Plaza
18 Xi Zang Zhong Road Shanghai
200001
People's Republic of China
Phone: 8621-5385-3355
Fax: 8621-6249-0879
hongkong.sales@belden.com

Singapore
101 Thomson Road
#21-01 United Square
Singapore 307591
Phone: 65-6251-8211
Fax: 65-6251-5010
singapore.sales@belden.com

CANADA

Cobourg
130 Willmott Street
Cobourg, Ontario K9A 4M3
Canada
Phone: 905-372-8713
Fax: 905-372-6291
salescobourg@belden.com

Montreal
2345 Boulevard des Sources
Pointe Claire, Quebec
Canada H9R 5Z3
Phone: 800-681-6131
Fax: 514-822-7968
ibdn.info@belden.com

EUROPE/AFRICA/MIDDLE EAST

France
Immeuble le Cesar
20, Place Louis Pradel
69001 Lyon
France
Phone: 33-472-109-990
Fax: 33-478-298-409
venlo.salesinfo@belden.com

Italy
Via Paracelso, 26
Centro Direzionale Colleoni
Palazzo Cassiopea Ingr. 3
20041 Agrate Brianza (MI)
Italy
Phone: 39-039-656-0911
Fax: 39-039-656-0929
venlo.salesinfo@belden.com

Africa/Middle East
Dubai Internet City
Building One, Office 216
Dubai
United Arab Emirates
Phone: 97-14-391-0490
Fax: 97-14-391-8775
sales@belden.ae

The Netherlands
Division Headquarters – Europe
Edisonstraat 9, Postbus 9
5928 PG Venlo, 5900 AA
The Netherlands
Phone: 31-773-878-555
Fax: 31-773-878-448
venlo.salesinfo@belden.com

United Kingdom
3000 Manchester Business Park
Aviator Way
Manchester M22 5TG
United Kingdom
Phone: +44-161-266-1115
Fax: +44-161-266-1339
venlo.salesinfo@belden.com

LATIN AMERICA AND THE CARIBBEAN ISLANDS

Regional Office
6100 Hollywood Boulevard
Suite 110
Hollywood, Florida 33024
Phone: 954-987-5044
Fax: 954-987-8022
salesla@belden.com

Mexico
Insurgentes Sur 800, Piso 9
Colonia del Valle
03100 Mexico, D.F.
Mexico
Phone: 5255-5523-7733
Fax: 5255-5528-8077
salesmex@belden.com

Brazil
Av. Rebouças
1023 – 4 Andar
05401-300 Sao Paulo, SP Brasil
Phone: 5511-3061-3099
Fax: 5511-3061-3752
salesBRZL@belden.com

EXHIBIT “E”

AGREEMENT FORM

ATTACHED

PUBLIC WORKS CONSTRUCTION AGREEMENT
BY AND BETWEEN

THE CITY OF RANCHO MIRAGE

AND

_____

THIS PUBLIC WORKS CONSTRUCTION AGREEMENT ("Agreement") is made and entered into this ____ day of _____, 2016, by and between the City of Rancho Mirage, hereinafter referred to as "City," and _____, a _____, hereinafter referred to as "Contractor."

RECITALS

WHEREAS, the City desires to retain Contractor, on an independent contractor basis, to perform services _____ as more particularly described below; and

WHEREAS, the Contractor represents that it is fully qualified to perform such services by virtue of its experience and the training, education and expertise of its principals and employees; and

WHEREAS, the City's Request for Proposals for Intersection Traffic Signal Upgrade Services dated May 18, 2016, is incorporated into this Agreement by this reference.

NOW THEREFORE, in consideration of the mutual promises and releases contained herein, and for other good and valuable consideration, receipt of which is hereby acknowledged, the Parties agree as follows:

AGREEMENT

1. Incorporation by Reference

The foregoing recitals are hereby expressly made a part of this Agreement as though fully set forth herein.

2. Project Information.

- Location: _____ as depicted in Contractor's proposal dated _____, 2016, and attached hereto and incorporated herein as Exhibit "A"

("Scope of Services" or sometimes "Project"). In the event any conflict exists between this Agreement minus the Scope of Services, on the one hand, and the Scope of Services, on the other hand, the former shall supersede.

- Project description, including significant materials to be used and equipment to be installed: _____, in the City of Rancho Mirage, California, as set forth in the Scope of Services.

- License classification applicable to Project: _____
- Approximate start date: _____
- Approximate completion date: _____
- Substantial completion of work evidenced by: Inspection and approval by City Staff.

- It is expressly agreed that except for extensions of time duly granted by the City, in writing, time shall be of the essence.

3. Contractor Information

- Address: _____
- License Number: _____

4. Insurance Coverage

a. Contractor shall procure and maintain at its own expense, until completion of performance and acceptance by the City, commercial general liability insurance of not less than One Million Dollars ($1,000,000) combined single limit per occurrence, and Two Million Dollars ($2,000,000) in the aggregate, for bodily injury, personal injury, death, loss or damage resulting from the wrongful or negligent acts by the Contractor or its officers, employees, servants, volunteers and agents and independent contractors. Contractor shall provide insurance on an occurrence, not claims-made basis. Contractor acknowledges and agrees that, for purposes of clarification with the intention of avoiding gaps in coverage with any umbrella or excess insurance, personal and advertising injury coverage shall be triggered by an "offense" while bodily injury and property damage coverage shall be triggered by an "occurrence" during the policy period.

b. Contractor shall further procure and maintain at its own expense, until completion of performance and acceptance by the City, commercial vehicle liability insurance covering personal injury and property damage, of not less than One Million

Dollars ($1,000,000) combined single limit per occurrence, and Two Million Dollars in the aggregate ($2,000,000), covering any vehicle utilized by Contractor or its officers, employees, servants, volunteers and agents and independent contractors in performing the services required by this Agreement.

c. Unless Contractor has no employees and is exempt from worker's compensation requirements, Contractor shall further procure and maintain at its expense, until completion of performance and acceptance by the City, workers' compensation insurance providing coverage as required by the California State Workers' Compensation Law. If any class of employees employed by the Contractor pursuant to this Agreement is not protected by the California State Workers' Compensation Law, Contractor shall provide adequate insurance for the protection of such employees to the satisfaction of the City. Contractor agrees to waive its statutory immunity under any workers' compensation or similar statute, as respecting the City, and to require any and all subcontractors and any other person or entity involved in the Project to do the same.

Worker's Compensation Insurance:

□ Contractor has no employees and is exempt from workers' compensation requirements.

□ Contractor carries workers' compensation insurance for all employees.

d. All policies required by this section shall be secured from insurers authorized to do business in the State of California with an "A" policyholder's rating or better and a financial rating of at least Class VII, in accordance with the current Best's Ratings.

e. Contractor agrees to require that all parties, including but not limited to subcontractors, architects, engineers or others with whom Contractor enters into contracts or whom Contractor hires or retains pursuant to or in any way related to the performance of this Agreement, provide the insurance coverage required herein, at minimum, and name as additional insureds the parties to this Agreement. Contractor agrees to monitor and review all such coverage and assumes all responsibility for ensuring that such coverage is provided in conformity with the requirements of this Section.

f. In the event this Agreement is terminated for any reason prior to the completion of all obligations and requirements of this Agreement, Contractor agrees to maintain all coverages required herein until the City provides written authorization to

terminate the coverages following the City's review and determination that all liability posed under this Agreement as to the party providing insurance has been eliminated.

g. Contractor agrees and acknowledges that if it fails to obtain all of the insurance required in this Agreement in accordance with the requirements herein, or to obtain and ensure that the coverage required herein is maintained by any subcontractors or others involved in any way with the Project, Contractor shall be responsible for any losses, claims, suits, damages, defense obligations, or liability of any kind or nature attributable to the City, and/or their officers, employees, servants, volunteers, agents and independent contractors.

5. <u>Insurance Documentation</u>

a. Contractor shall provide certificates of insurance with original endorsements to the City as evidence of the insurance coverage required herein. Certificates of such insurance shall be filed with the City on or before commencement of performance of this Agreement. Contractor shall ensure that the most current certification of insurance shall be delivered to the City at all times until completion of performance and acceptance by the City.

b. Notwithstanding any inconsistent statement in any required insurance policies or any subsequent endorsements attached thereto, the comprehensive general liability and commercial vehicle liability policies shall bear endorsements whereby it is provided that the City, and its officers, employees, servants, volunteers, agents and independent contractors are named as additional insureds. Additional insureds shall be entitled to the full benefit of all insurance policies in the same manner and to the same extent as any other insureds and there shall be no limitation to the benefits conferred upon them other than policy limits to coverages.

c. Contractor shall require the carriers of all required insurance policies to waive all rights of subrogation against the City, and their officers, employees, servants, volunteers, agents and independent contractors.

d. Each policy required herein must be endorsed to provide that the policy shall not be cancelled or non-renewed by either party, or reduced in coverage or limits (except by paid claims) unless the insurer has provided the City with at least thirty (30) days prior written notice of said cancellation, non-renewal, or reduction, with the exception that only ten (10) days prior written notice shall be required in the event of cancellation for nonpayment of premium.

e. All insurance policies required to be provided by Contractor or any other party must be endorsed to provide that the policies shall apply on a primary and noncontributing basis in relation to any insurance or self-insurance, primary or excess, maintained or available to the City, and their officers, employees, servants, volunteers, agents and independent contractors.

6. Security

a. Contractor shall, concurrently with the execution hereof and to the extent not already completed, furnish a payment bond at no expense to the City, in substantially the same form as that attached hereto and made part hereof as Exhibit "B," in an amount equal to _____Dollars and No Cents **($**_____**)**, as security of the payment of all persons performing labor and furnishing materials in connection with this Agreement. To be acceptable, the surety company must be authorized to do business and have an agent for service of process in California, be on the accredited list of the United States Treasury Department, and have an "A" policyholder's rating and a financial rating of Class V, or better, in accordance with the current Best's Rating.

b. Contractor shall, concurrently with the execution hereof and to the extent not already completed, furnish a performance bond at no expense to the City, in substantially the same form as that attached hereto and made part hereof as Exhibit "C," or deposit an amount with the City equal to _____Dollars and No Cents **($**_____**)**, as security for the faithful performance of this Agreement. To be acceptable, the surety company must be authorized to do business and have an agent for service of process in California, be on the accredited list of the United States Treasury Department, and have an "A" policyholder's rating and a financial rating of Class V, or better, in accordance with the current Best's Rating.

c. The surety on any and all bonds and the form thereof shall be satisfactory to the City Attorney.

7. Compensation; Payments

a. Contractor shall be paid compensation not to exceed _____ Dollars and No Cents **($**_____**)** for the services rendered by Contractor pursuant to this Agreement, including profit, labor and materials.

b. Contractor shall invoice the City for the performance of the services under this Agreement in the amount agreed upon by the parties herein. Subject to the retention provisions below, Contractor shall be paid the amount specified in the invoice

within 30 days of receipt by the City, provided that the services reflected in the invoice were performed to the reasonable satisfaction of the City in accordance with the terms of this Agreement.

c. Pursuant to Public Contract Code section 9203, the City shall retain no less than five (5) percent of the compensation to be paid to Contractor which shall be released to the Contractor no later than sixty (60) days from the date of the City's acceptance of the work pursuant to this Agreement.

8. Extra Work and Change Orders

Extra work and change orders shall become a part of this Agreement once the extra work or change order is approved in writing and signed by the City and Contractor, prior to the commencement of any extra work or change in work covered by the change order. The City's form change order shall be used for both extra work and a change in work. The change order must describe the scope of the extra work or change in work, and the cost to be added or subtracted from this Agreement. The City shall not require Contractor to perform any extra work or a change in work without written authorization. A change order shall not be enforceable against the City unless the change order complies with this provision.

9. Term

Contractor will perform the services set forth in the Scope of Services and in any approved change orders pursuant to section 1 of this Agreement, the term of which shall commence as of _____, and shall expire one year following the City's acceptance of the work pursuant to this Agreement.

10. Independent Contractor

Contractor shall at all times during the term of this Agreement perform the services described in this Agreement as an independent contractor, and hereby waives any claims for any compensation or benefits afforded to City employees and not to independent contractors.

11. Civil Code Section 1542 Waiver

a. Contractor expressly waives any and all rights and benefits conferred upon it by the provisions of section 1542 of the California Civil Code which reads as follows:

"A general release does not extend to claims which the creditor does not know or suspect to exist in his or her favor at the time of executing the release, which if known by him or her must have materially affected his or her settlement with the debtor."

b. This waiver shall be effective as a bar to any and all actions, fees, damages, losses, claims, liabilities and demands of whatsoever character, nature and kind that are known or unknown, or suspected or unsuspected, including, without limitation, claims of entitlements under the California Public Employees' Retirement System (CalPERS) that are only afforded to employees and not independent contractors. Contractor further represents and warrants that it understands this waiver and that if it does not understand this waiver, it shall seek the advice of a qualified attorney before executing this Agreement.

_____
Initials

12. Acceptance of Work

Acceptance of the work shall be by action of the City Council or its designee. Neither the acceptance nor prior inspections or failure to inspect shall constitute a waiver by the City of any defects in the work. From and after acceptance, the work shall be owned and operated by the City. As a condition to acceptance, Contractor shall certify to the City in writing that all of the work has been performed in strict conformity with this Agreement and that all costs have been paid, satisfactory to the City, guaranteeing such performance.

13. Warranty

a. In addition to Contractor's other obligations under this Agreement, Contractor warrants all work and materials to be of good quality and fit for the purpose and intended use. Contractor shall also repair, replace and restore any other work which is displaced in correcting defective work as well as other portions of the work which the City by reason of such defects reasonably suspects may also be defective. In the event of a failure to commence with the compliance of above-mentioned conditions within seven calendar days after being notified in writing or failure to diligently pursue such compliance to completion, the City is hereby authorized to proceed to have the defects repaired and made good at the expense of Contractor who hereby agrees to pay the cost and charges therefor immediately on demand.

b. If, in the opinion of the City, nonconforming work creates a dangerous condition or requires immediate correction or repair to prevent further loss to the City or to prevent interruption of operations, the City shall attempt to give the Contractor notice. If Contractor cannot be contacted or does not comply with the City's request for correction within a reasonable time as determined by the City, the City may proceed to make such correction or provide such repair. The costs of such correction or repair shall be charged against Contractor, who agrees to make payment for said costs upon demand. Corrective action by the City will not relieve Contractor or Contractor's sureties or insurers of the guarantees and indemnities of this Agreement.

c. This section does not in any way limit the City's remedies available under the law, or the guarantee on any items for which a longer guarantee is specified or on any items for which a manufacturer or supplier gives a longer guarantee period. Contractor agrees to act as a co-guarantor with such manufacturer or supplier and shall furnish the City all appropriate guarantees or warranty certificates upon completion of the project. No manufacturer's guarantee period shall in any way limit the liability of Contractor or Contractor's sureties and insurers under the indemnity or insurance provisions of this Agreement.

14. Indemnification

a. Contractor shall defend, indemnify and hold harmless the City, their officers, officials, agents, employees and volunteers from and against any and all claims, demands, actions, losses, damage, injuries, and liability, direct or indirect (including any and all costs and expenses in connection therewith) arising out of the performance of this Agreement, except for any such claim arising out of the sole negligence or willful misconduct of the City, or their officers, agents, employees or volunteers.

b. The City does not, and shall not, waive any rights that it may have against Contractor under this Section because of the acceptance by the City, or the deposit with the City, of any insurance policy or certificate required pursuant to this Agreement. The hold harmless, indemnification and duty to defend provisions of this Section shall apply regardless of whether or not said insurance policies are determined to be applicable to the claim, demand, action, damage, liability, loss, cost or expense described herein.

c. Notwithstanding the foregoing provisions of this section, Contractor shall not be responsible for damages or be in default or deemed to be in default by reason of delay caused by strikes, lockouts, accidents, or acts of God, or the failure of the City to furnish timely information or to approve or disapprove Contractor's work promptly, or by

reason of delay or faulty performance by the City, construction contractors, or governmental agencies, or by reason of any other delays beyond Contractor's control, or for which Contractor is without fault.

15. Default

a. Failure or delay by any party to this Agreement to perform any material term or provision of this Agreement shall constitute a default under this Agreement; provided however, that if the party who is otherwise claimed to be in default by the other party commences to cure, correct or remedy the alleged default within fifteen days after receipt of written notice specifying such default and shall diligently complete such cure, correction or remedy, such party shall not be deemed to be in default hereunder.

b. The party which may claim that a default has occurred shall give written notice of default to the party in default, specifying the alleged default. Delay in giving such notice shall not constitute a waiver of any default nor shall it change the time of default; provided, however, the injured party shall have no right to exercise any remedy for a default hereunder without delivering the written default notice, as specified herein.

c. Any failure or delay by a party in asserting any of its rights or remedies as to any default shall not operate as a waiver of any default or of any rights or remedies associated with a default.

d. In the event that a default of any party to this Agreement may remain uncured for more than fifteen days following written notice, as provided above, a "breach" shall be deemed to have occurred. In the event of a breach, the injured party shall be entitled to seek any appropriate remedy or damages by initiating legal proceedings.

16. Licenses, Certifications and Permits

Contractor represents that it has obtained and will maintain at all times during the term of this Agreement all professional and/or business licenses, certifications and/or permits necessary for performing the services described in this Agreement.

17. Labor Laws, Prevailing Wages

a. All work or services performed within the State of California pursuant to this Agreement by Contractor, Contractor's employees and independent contractors, or Contractor's subcontractors and its subcontractors' employees and independent contractors shall be performed by individuals lawfully permitted to perform such work or services in the State of California and/or the United States of America pursuant to all

applicable State and/or Federal labor laws, rules and regulations including, but not limited to, any State or Federal law, rule or regulation prohibiting the employment of undocumented workers or any other person not lawfully permitted to perform said work or services in the State of California or the United States of America.

b. Contractor represents that it is an equal opportunity employer and shall not discriminate against any subcontractor, employee, or applicant ("person") for employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, sex, age or sexual orientation. Unless otherwise permitted under the law, Contractor shall not refuse to hire or employ any such person or refuse to select any such person for a training program leading to employment, or bar or discharge any such person from employment or from a training program leading to employment, or otherwise discriminate against any such person in compensation or in terms, conditions, or privileges of employment.

c. Contractor and all of Contractor's subcontractors, if any, shall pay each employee engaged in all applicable trades or occupation not less than the prevailing hourly wage rate for work of a similar character in the locality in which the public work is performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work. In accordance with the provisions of Section 1770 of the California Labor Code ("Labor Code"), the Director of Department of Industrial Relations of the State of California has determined the general prevailing rates of wages and employer payments for health and welfare, pension, vacation, travel time, and subsistence pay as provided for in Labor Code Section 1773.8, apprenticeship or other training programs authorized by Labor Code Section 3093 and similar purposes applicable to the work to be done. Said wages are available through the California Department of Industrial Relations' Internet website at http://www.dir.ca.gov/dlsr/PWD/index.htm and are on file at City Hall, as provided in Section 1773.2 of the Labor Code. Said rates shall be posted at the Project site where work is to be performed, in accordance with Labor Code Section 1773.2. Contractor shall access a copy of the wage rate determination and shall make all subcontractors, if any, aware of the determination. As the wage determination for each craft reflects an expiration date, it shall be the Contractor's responsibility to ensure that the prevailing wage rates of concern are current and paid. Subject to the safe harbor provisions of Labor Code Section 1775, Contractor shall forfeit to the City an amount not to exceed two hundred dollars ($200) for each calendar day or portion thereof, as set by the Labor Commissioner in accordance with the terms of Labor Code section 1775, for each laborer, workmen or mechanics employed that is paid less than the general prevailing rate of wages herein referred to and stipulated for any work done under the proposed contract, by him, or by any subcontractor under him,

in violation of the provisions of the Labor Code, and in particular, Sections 1770 to 1781 inclusive. Contractor and any and all or its subcontractors shall forfeit to the City twenty-five dollars ($25) for each worker employed in the performance of this Agreement for each calendar day during which the worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of the provisions of Section 1813 of the Labor Code.

d. Contractor and all subcontractors hired to perform any work under the Project shall keep accurate payroll records, including the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each worker, in accordance with Section 1776 of the Labor Code. Payroll records shall be on forms provided by the Division of Labor Standards Enforcement ("DLSE") or in a manner containing the same information as the forms provided by the DLSE. Failure to comply with the above may result in monetary penalties to the Contractor or affected subcontractor. Payroll records shall be verified by written declaration made under penalty of perjury, that the information contained in the records is true and correct. Contractor and any and all subcontractors shall make a certified copy of all payroll records available for inspection by DLSE, the City or any member of the public and otherwise provide certified copies of such records to any of the foregoing within ten (10) days of Contractor's and subcontractor's receipt of written request therefor. Failure to comply with the above may result in monetary penalties, in accordance with Labor Code Section 1776(d) and (h).

e. Notwithstanding anything else to the contrary, Contractor hereby acknowledges that all contractors must be registered with the Department of Industrial Relations ("Department") pursuant to Labor Code Section 1725.5 in order to be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any public work contract, including this Agreement, that is subject to the payment of prevailing wages. Contractor represents and warrants that Contractor is registered with the Department in the manner prescribed by the Department and has paid the requisite application fee, as required by Labor Code Section 1725.5. Moreover, prior to Contractor entering into any contracts with any subcontractor, Contractor shall obtain proof that all such subcontractors have also registered with the Department in accordance with Section 1725.5.

18. Notices

a. Any notice to be provided pursuant to this Agreement shall be in writing, and all such notices shall be delivered by personal service or by deposit in the United

States mail, certified or registered, return receipt requested, with postage prepaid, and addressed to the parties as follows:

To the City: Mark W. Sambito,Director of Public Works
City of Rancho Mirage
69-825 Highway 111
Rancho Mirage, CA 92270
Telephone: (760) 770-3224
Facsimile: (760) 770-3261
Email: marks@RanchoMirageCA.gov

To Contractor: _____
_____
_____
_____

c. Notices, payments and other documents shall be deemed delivered upon receipt by personal service or as of the second (2nd) day after deposit in the United States mail.

19. General Conditions

a. Severability. If any one or more of the sentences, clauses, paragraphs or sections contained herein is declared invalid, void or unenforceable by a court of competent jurisdiction, the same shall be deemed severable from the remainder of this Agreement and shall not affect, impair or invalidate any of the remaining sentences, clauses, paragraphs or sections contained herein.

b. Governing Law. The validity of this Agreement and any of its terms or provisions, as well as the rights and duties of the parties under this Agreement, shall be construed pursuant to and in accordance with California law.

c. Cumulative Remedies. Except with respect to rights and remedies expressly declared to be exclusive in this Agreement, the rights and remedies of the parties are cumulative and the exercise by either party of one or more of such rights or remedies shall not preclude the exercise by it, at the same or different times, of any other rights or remedies for the same default of any other default by the other party.

d. Venue. All proceedings involving disputes over the terms, provisions, covenants or conditions contained in this Agreement and all proceedings involving any enforcement action related to this Agreement shall be initiated and conducted in the applicable court or forum in Riverside County, California.

e. Litigation Expenses and Attorneys Fees. In the event any action, suit or proceeding is brought for the enforcement of, or the declaration of any right or obligation pursuant to this Agreement or as a result of any alleged breach of any provision of this Agreement, the prevailing party in such suit or proceeding shall be entitled to recover its costs and expenses, including reasonable attorney's fees, from the losing party, and any judgment or decree rendered in such a proceeding shall include an award thereof.

f. Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed to be an original.

g. Entire Agreement. This Agreement contains all of the covenants and agreements between the parties with respect to the subject matter of this Agreement, and supersedes any and all other agreements, either oral or written, between the City and Contractor. Each party to this Agreement acknowledges that no representations, inducements, promises, or agreements have been made by or on behalf of any party except those covenants and agreements embodied in this Agreement. No agreement, statement, or promise not contained in this Agreement shall be valid or binding.

h. Conflicts of Interest. Contractor covenants that it does not have any interest, nor shall it acquire an interest, directly or indirectly, which would conflict in any manner with the performance of Contractor's services under this Agreement. In the event the City officially determines that Contractor must disclose its financial interests by completing and filing a Fair Political Practices Commission Form 700, Statement of Economic Interests, Contractor shall file the subject Form 700 with City Hall, as specified under the Notice provisions of this Agreement, pursuant to the written instructions provided by the City.

i. Termination. This Agreement may be terminated by the City immediately for cause. The City may terminate this Agreement without cause upon thirty (30) days' written notice of termination. Upon termination, Contractor shall be entitled to compensation for services performed up to the effective date of termination.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the date first written above.

CITY OF RANCHO MIRAGE

_____

_____

Randal K. Bynder, City Manager

_____

By Its: _____

APPROVED AS TO CONTENT:

_____

Mark W Sambito, Director of Public Works

ATTEST:

_____

Cynthia Scott, City Clerk

APPROVED AS TO FORM:

_____

Steven B. Quintanilla, City Attorney

EXHIBIT “A”

SCOPE OF SERVICES

SEE ATTACHED PROPOSAL DATED _____

EXHIBIT "B"

PAYMENT BOND

We, _____,as Principal, and _____, as Surety, jointly and severally, firmly bind ourselves, our heirs, representatives, successors and assigns, as set forth herein, to the City of Rancho Mirage ("CITY") and those for whose benefit this bond insures in the sum of _____ **U.S. Dollars and No Cents ($_____)**. CITY and Principal have entered into an agreement, or are about to enter into the agreement attached hereto and incorporated by reference, for the construction of improvements for the property referenced in said agreement. Surety herein approves of the terms and conditions of said agreement and binds itself to faithfully perform the obligations of Principal therein if Principal fails to so perform. Surety acknowledges that the agreement herein referenced shall be that document as executed by CITY and Principal. If Principal or any of Principal's contractors or subcontractors, fails to pay any of the persons named in Section 9000 *et seq*. of the California Civil Code employed in the performance of the agreement for materials furnished or for labor thereon of any kind, or for amounts due under the Unemployment Insurance Code with respect to such work or labor, then Surety shall pay the same in an amount not exceeding the sum specified above, and also shall pay, in case suit is brought upon this bond, such reasonable attorneys' fees as shall be fixed by the court.

Surety agrees that it shall pay the amounts due the persons above named and diligently perform the agreement upon Principal's default after notice and within the time specified in the agreement. If Surety fails to perform within the times specified in the agreement, Surety shall promptly on demand deposit with CITY such amount as CITY may reasonably estimate as the cost of completing all of Principal's obligations. Surety's obligation for payment herein shall extend, notwithstanding any controversy between Principal and CITY regarding Principal's failure under the agreement. Principal and Surety agree that any payment by Surety pursuant to this paragraph should be conclusively presumed between the parties herein to relieve, as demanded, Surety's obligation herein and shall be deemed proper payment as between Principal and Surety.

This bond shall insure to the benefit of any and all of the persons named in Section 9000 *et seq*. of the California Civil Code so as to give a right of action to them or their assigns in any suit brought upon this bond.

Surety agrees that no change, extension of time, alteration, or addition to the terms of the agreement, or the work to be performed thereunder, or the plans and specifications, or any matters unknown to Surety which might affect Surety's risk, shall in any way affect its obligation on this bond, and it does hereby waive notice thereof.

Principal and Surety agree that should CITY become a party to any action on this bond, that each will also pay CITY'S reasonable attorneys' fees incurred therein in addition to the above sums.

Executed this _____ day of _____, 20___.

Seal of Corporation

By_____
Authorized Representative of Principal
Title_____

(ATTACH ACKNOWLEDGEMENT)

By_____
Authorized Representative of Principal
Title_____

Any claims under this bond may be addressed to: (check one)

Surety's agent for service of process in California:

( ) _____
Surety Company

_____
Name

_____
Street Number

_____
Street Number

_____
City and State

_____
City and State

_____
Telephone Number

_____
Telephone Number

_____

By_____
Attorney in Fact or other Representative

(ATTACH ACKNOWLEDGEMENT OF AUTHORIZED REPRESENTATIVE)

( ) _____
Company Agent

_____
Street Number

APPROVED AS TO FORM:

_____
City and State

_____
City Attorney

_____

Furnish the name, address and phone number of the company agent as well as the surety company.

Sureties must be authorized to do business in and have an agent for service of process in California and be on the accredited list of the United States Treasury Department (their bonds will be limited to such amounts as would be acceptable to the Treasury Department), and otherwise meet the requirements of the agreement.

EXHIBIT "C"

PERFORMANCE BOND

We,_____, as Principal, and _____, as Surety, jointly and severally, firmly bind ourselves, our heirs, representatives, successors and assigns, as set forth herein, to the City of Rancho Mirage ("CITY") for payment of the penal sum of _____ **U.S. Dollars and No Cents ($_____)**. CITY and Principal have entered into an agreement, or are about to enter into the agreement attached hereto and incorporated by reference, for the construction of improvements for the property referenced in said agreement. Surety herein approves of the terms and conditions of said agreement and binds itself to faithfully perform the obligations of Principal therein if Principal fails to so perform. Surety acknowledges that the agreement herein referenced shall be that document as executed by CITY and Principal.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the Principal shall in all things stand to and abide by, and well and truly keep and perform all of the covenants, conditions, and provisions in said agreement, and any alteration thereof made as therein provided, on Principal's part to be kept and performed at the time and in the manner therein specified, and shall indemnify and save harmless the CITY, CITY'S engineer, and their consultants, and each of their officials, directors, officers, employees and agents, as therein stipulated, then this obligation shall become null and void; otherwise, it shall be and remain in full force and effect.

Surety agrees that should it fail to take over and diligently perform the agreement upon Principal's default after notice and within the time specified in the agreement, Surety will promptly on demand deposit with CITY such amount as CITY may reasonably estimate as the cost of completing all of Principal's obligations. Surety's obligation for payment herein shall extend, notwithstanding any controversy between Principal and CITY regarding Principal's failure under the agreement should be conclusively presumed between the parties herein to relieve, as demanded, Surety's obligations herein and shall be deemed proper payment as between Principal and Surety.

Surety agrees that no change, extension of time, alteration, or addition to the terms of the agreement, or the work to be performed thereunder or the plans and specifications, or any matters unknown to Surety which may affect Surety's risk shall in any wise affect its obligation on this bond, and it does thereby waive notice thereof.

Principal and Surety agree that if the CITY is required to engage the services of an attorney in connection with the enforcement of this bond, each shall pay CITY'S reasonable attorneys' fees incurred, with or without suit, in addition to the above sum.

Executed this _____day of _____, 20___.

Seal of Corporation

By_____
Authorized Representative of Principal
Title_____

By_____
Authorized Representative of Principal
Title_____

(ATTACH ACKNOWLEDGEMENT OF AUTHORIZED REPRESENTATIVES)

Any claims under this bond may be addressed to: (check one)

Surety's agent for service of process in California:

( )_____
Surety Company

_____
Name

_____
Street Number

_____
City and State

_____
Telephone Number

_____
Street Number

_____
City and State

_____
Telephone Number

By_____
Attorney in Fact or other Representative

(ATTACH ACKNOWLEDGEMENT OF AUTHORIZED REPRESENTATIVE)

()_____
Company Agent

_____
Street Number

APPROVED AS TO FORM:

_____
City and State

_____
City Attorney

_____
Telephone

Furnish the name, address and phone number of the company agent as well as the surety company.

Sureties must be authorized to do business in and have an agent for service of process in California and be on the accredited list of the United States Treasury Department (their bonds will be limited to such amounts as would be acceptable to the Treasury Department), and otherwise meet the requirements of the agreement.

EXHIBIT "F"

ACKNOWLEDGEMENT OF INSURANCE ENDORSEMENTS

In recognition of _____ ("Company") having submitted a proposal to the City of Rancho Mirage Request for Proposals for Intersection Traffic Signal Wire Upgrade Services, dated May 18, 2016 ("RFP"), issued by the City of Rancho Mirage ("City"), and in further recognition that the City requires Company to comply with certain insurance requirements as set forth in Sections 4 and 5 ("Insurance Provisions") of the Agreement (which Agreement is defined in and made part of the RFP), I represent that I am authorized to sign on behalf of the insurance company listed below ("Insurer"), and by signing below, I acknowledge, warrant and represent that Insurer possesses the ability to, and if requested by Company, shall furnish all the insurance endorsements prescribed in the Insurance Provisions within thirty (30) days of contract award, as respecting ○ worker's compensation and/or ○ commercial general liability and/or ○ commercial vehicle liability insurance and/or ○ professional liability [PLEASE CHECK ALL THAT APPLY].

Name of Insurer [Print]

_____
Name, Title [Print]

_____
Signature

N:\RNCH\0008-09 General Matters\DOC\6003 – RFP Traffic Signal Wire Upgrade (Redline 05.18.16).docx